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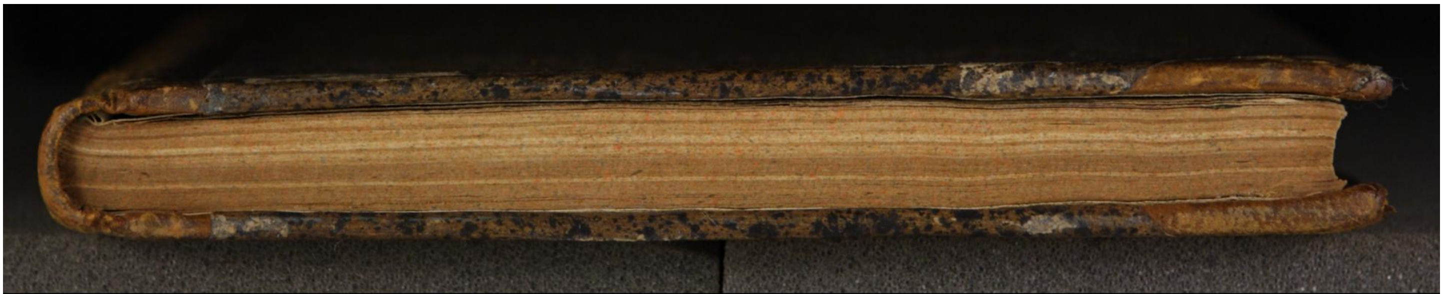


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JOANNIS KEPLERI
IMP. CÆS. FERDINANDI II. MATHEMATICI
CHILIAS
LOGARITHMORUM
AD TOTIDEM NUMEROS ROTUNDOS,

Præmiſsâ

DEMONSTRATIONE LEGITIMA

Ortus Logarithmorum eorumq; uſus

QVIBUS

NOVA TRADITUR ARITHMETICA, SEU COMPENDIUM, QVO POST NUMERORUM NOTITIAM nullum nec admirabilius, nec utilius ſolvendi pleraq; Problemata Calculatoria, præſertim in Doctrina Triangulorum, citra Multiplicationis, Diviſionis, Radicumq; extractionis, in Numeris prolixis, labores moleſtiſſimos.

AD

ILLUSTRISS. PRINCIPEM ET DOMINUM
DN. PHILIPPUM LANDGRAVIUM HASSIÆ, &c.

EDITIO SECUNDA.

MARPURGI CATTORUM,
Ex Officina Typographica CASPARIS CHEMLINI.
cIɔ Iɔ c XXXIX.

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AD

ILLVSTRISSIMVM

PRINCIPEM ET DOMINUM

DN. PHILIPPVM LAND-GRAVIVM HASSIÆ, COMITEM CATTIMElibocci, Sigenæ, Ditii, & Niddæ,

Dominum meum Clementiſſimum.

DE, MUNERE EIUS CELSIT. AMPLISSIMO, deq; uſitata Celſ. ſuæ alluſione, & alliteratione ad Nomen

Philips / Villiebs.

TRIGINTA *expenſis vendit φίλα πολλὰ Philippis*
Princeps PHILIPPUS Haſſiæ.
Sed facies rerum verſa eſt; pauperculus emptor
Mercem preciumq; rettulit.
Triginta accepti, ſed vendidit ille Magiſtrum
Mortalium immaniſſimus.
I nunc & dubita, Tharſenſi interprete; num ſit
Dare quàm accipere beatius.
Triginta tamen en penſo totidem ἄργυρα verbis*
φίλα πολλὰ penſo Chiliade.
Corde, manu, promis redolentia munera fontes:
Mentemq; redolent quæ accipis.
Corde φιλεῖς, manibus πλουτεῖς, ſed Mente θεωρεῖς;
Tibi cor, manus, mentem dico.

Illuſtr. Celſ. T.

Subjectiſſimus Cultor Gratusq; hoſpes

JOHAN. KEPLERUS.

* *Propoſitionibus.*

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DEMONSTRATIO STRUCTURÆ LOGARITHMORUM.

POSTULATUM I.

OMNES proportiones inter ſe aqua-les, quacunq; varietate binorum u-nius, & binorum alterius termino-rum, eadem quantitate metiri ſeu exprimere.

AXIOMA I.

Si fuerint quantitates quotcunq; ejuſdem generis, quotcunq; ordine ſibi invicem ſuccedentes, ut ſi ordine magnitudinis ſibi invicem ſuccedant: proportio extremarum compoſita eſſe intelligitur ex omnibus proportionibus intermediis binarum, & binarum inter ſe vicinarum.

Seu, quod eodem redit, proportio minuitur aucto minori termino, vel diminuto majori; augetur rationibus contrariis.

I. PROPOSITIO.

Medium proportionale inter duos terminos dividit proportionem terminorum in duas proportiones inter ſe æquales.

Nam ſi ſunt duo termini, eorumq; medium proportionale: eſt ergò inter tres quantitates Analogia ſeu Proportionalitas.

At Analogia definitur aqualitate τῶν λόγων *proportio-*

num

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EXEMPLUM SECTIONIS,

In quâ proportio, quæ eſt inter 10. & 7. triceſimo actu, in partes æquales 1073741724. ſecatur, per totidem (unâ minus) medias proportionales claſſis triceſimæ, ubi ex unaqualibet claſſe ſola maxima, & termino proportionis majori viciniſſima, hic exprimitur.

Denominatio per Numeros ſectionum, Media proportionales, quæ eſt omnium in quælibet ſectione maxima.

Numeri partium proportionis æqualium, quas unius cujuslibet claſſis mediæ proportionales conſtituunt.

Major terminus.	100000	00000	00000	00000	
30 æ.	99999	99996	67820	56900	1073741824.
29 æ.	99999	99993	35641	13801	536870912.
28 æ.	99999	99986	71281	27702	268435456.
27 æ.	99999	99973	42564	55589	134217728.
26 æ.	99999	99946	85129	12883	67108864.
25 æ.	99999	99893	70258	38590	33554432.
24 æ.	99999	99787	40516	88629	16777216.
23 æ.	99999	99574	81034	22452	8388608.
22 æ.	99999	99149	62070	25698	4190304.
21 æ.	99999	98299	24147	74542	2097152.
20 æ.	99999	96598	48324	51665	1048576.
19 æ.	99999	93196	96764	73647	524288.
18 æ.	99999	86393	93992	28474	262144.
17 æ.	99999	72787	89835	81819	131072.
16 æ.	99999	45575	87076	62114	65536.
15 æ.	99998	91152	03773	10068	32768.
14 æ.	99997	82305	26024	99026	16384.
13 æ.	99995	64615	25959	97766	8192.
12 æ.	99991	29249	47518	67706	4096
11 æ.	99982	58574	77102	11873	2048.
10 æ.	99965	17452	79822	51100	1024
9 æ.	99930	36118	40985	14780	512.
8 æ.	99860	77086	38438	31172	256.
7 æ.	99721	73557	52112	10274	128.
6 æ.	99444	24546	13234	50059	64.
5 æ.	98891	57955	37194	96652	32
4 æ.	97795	44506	62963	20009	16.
3 æ.	95639	49075	71498	12386	8.
2 æ.	91469	12192	28694	43920	4.
1 a.	83666	00652	34075	54820	2.
Minor terminus.	70000	00000	00000	00000	

&c.
Quindecim 4tæ.
Septem Tertiæ.
Tres Secundæ.
Vnica Prima.

Hæc unica prima in ſuâ ſeu primâ claſſe, fit etiam una eaq; media trium ſecundarũ; & tres ſecundæ iſtæ, ſunt etiam inter ſeptem tertias, mediæ ſcilicet inter alias quatuor accedentes: & hæ ſeptem tertiæ, inſertis aliis octo, fiunt quindecim quartæ, & ſic conſequenter.

Hic differentia maximæ ex triceſimis mediis proportionalibus à termino ſectæ proportionis majori, eſt iſta 00000. 00003. 32179. 43100. *Hæc igitur differentia conſtituitur ex arbitrio, pro menſurâ hujus minimi elementi, ſectæ proportionis, ſeu pro Logarithmo dictæ Triceſimarum maximæ. Hic igitur Logarithmus multiplicatus in numerum partium, quas conſtituunt illæ triceſimæ, producit ſequentem Logarithmum* 35667. 49481. 37222. 14400. *Hic eſt Logarithmus termini minoris, ſcilicet* 70000. 00000. 00000. 00000.

Hic numerus ſuperat numerum mediarum proportionalium cujuſq; claſſis.

Hic Typus ſic intelligatur

Inter Terminos, majorem 100, &c. & minorem 70 &c. quæratur media proportionalis, hæc erit $83\frac{2}{3}$ *&c. Sunt ergò proportionis inter dictos terminos conſtitutæ partes duæ, una inter 100. &* $83\frac{2}{3}$, *altera inter* $83\frac{2}{3}$ *& 70. Hæ per 1. prop. ſunt inter ſe æquales. Quæratur ſecundò, media proportionalis inter 100. &* $83\frac{2}{3}$ *&c. hæc erit* $91\frac{1}{2}$ *&c. altera inter* $91\frac{1}{2}$ *&c. &* $83\frac{2}{3}$. *&c. Ita prior ſemiſſis proportionis totius hîc eſt diviſus in duas quartas partes ejuſdẽ totius. Et intelligitur ſemiſſis alter, qui erat inter* $83\frac{2}{3}$ *& 70, per ſociã ipſius* $91\frac{1}{2}$, *ſeu ſecundarum triũ minimã (quæ in hoc typo non exprimitur) ſimiliter diviſus eſſe in alias duas quartas totius. Quæratur tertiò media proportionalis inter 100, &c. &* $91\frac{1}{2}$ *&c. hæc erit* $95\frac{2}{3}$ *&c. determinans cum 100. partem totius octavã, quod indicat numerus illi ad dextrã exterius reſpondens. Et ſic deinceps.*

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num: quare proportiones ſectione conſtitutæ, utpote partes proportionis totius propoſitæ ſunt inter ſe æquales.

AXIOMA *ſeu Notitia communis* II.

Si fuerint Quantitates quotcunq; creſcentes ordine: proportio extremarum diviſa eſt per intermedias in partes una plures quàm ſunt intermediæ, diviſionem facientes.

Sic quatuor interſtitia digitorum arguunt quinq; digitos. Sic quinque corpora regularia ſibi invicem inſerta ordine interpoſitis orbibus inſcriptis & circumſcriptis arguunt orbium talium ſex eſſe.

POSTULATUM II.

Proportionem inter datos duos terminos quoſcunq; dividere in partes quotcunq; (ut in partes numero continuè multiplici progreſsionis binariæ) & eouſq; donec partes oriantur minores quantitate propoſita.

Proportio enim eſt etiam una ex quantitatibus continuis in infinitum dividuis.

Vide hic typum diviſæ proportionis inter 10.7. per triginta proportionales medias. * * *

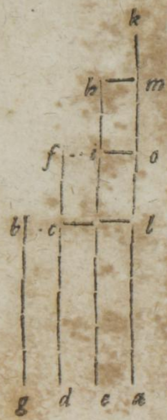
POSTULATUM III.

Minimum proportionis elementum quantulum pro minimo placuerit, metiri ſeu ſignare per quantitatem quamcunque; ut per exceſſum terminorum hujus Elementi.

II. PROPOSITIO.

Cum fuerint tres continuè proportionales, quæ eſt

proportio primæ ad ſecundam, vel ſecundæ ad tertiam, eadem eſt proportio differentiæ priorum, ad differentiam poſteriorum.



Sint continuè proportionales A K, E H, D F, differentia priorum K M, poſteriorum H I: Dico, ut eſt A K ad E H, ſic eſſe K M ad H I. Eſt enim H E ad F D, ut K A ad H E ex hypotheſi. Sed H E eſt æqualis ipſi M A, & F D æqualis ipſi I E, rurſum ex hypotheſi. Quare etiam M A erit ad I E, ut K A ad H E; quare per 17. quinti Eucl. etiam reſidua K M, ad reſiduam H I, erit ut tota K A, ad totam H E.

III. PROPOSITIO.

Cùm fuerint aliquot quantitates in proportione continua minimarum minima erit differentia, maximarum maxima.

Nam per 2. Prop. ſicut eſt maxima ad vicinam minorem, ſic eſt differentia inter maximas, ad differentiam ſuccedentium; Minor igitur eſt quælibet differentiarum ſuccedentium, quàm antecedens. Minima igitur eſt ultima differentia, qua ſcilicet eſt inter minimas.

IV. PROPOSITIO.

Cùm fuerint aliquot quantitates in proportione continuâ: ſi differentia maximarum ſtatuitur menſura proportionis illarum: differentiæ quarumcumque duarum deinceps erunt minores menſurâ proportionis illarum juſtâ.

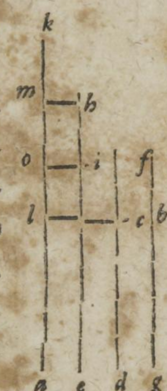
Nam quia ponuntur continuè proportionales, igitur æqualis eſt proportio inter duas maximas, & proportio inter quaſcunque duas minores deinceps ſitas per 1. Prop. Major verò eſt differentia inter maximas, differentiis inter quaſcunq; alias deinceps ſitas per 3. Si ergò major differentia ſtatuitur menſura proportio-

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portionis inter duas maximas per 3. poſtulatum: tunc eadem duarum maximarum differentia ſtatuitur etiam menſura proportionis inter duas minores deinceps ſequentes. At differentia inter duas minoret, minor etiam eſt differentia inter maximas per 3. Prop. quare etiam minor eſt, quàm ut ſuorum terminorum proportionem metiatur.

V. PROPOSITIO.

In continuè proportionalibus ſi differentia maximarum ſtatuitur menſura proportionis illarum: omnes reliquę proportiones, quę ſunt inter maximam & unamquamlibet reliquarum minorum, ſortientur menſuras, majores differentiis ſuorum terminorum.



Nam proportio maximæ A K ad minimam G B componitur ex proportionibus binarum, & binarum deinceps uſq; ad minimam, per Axioma 1. At omnes binarum deinceps ſitarum proportiones inter ſe ſunt æquales per 1. Prop. Menſuras igitur etiam æquales habent per Poſtulat. 1. Quare quot ſunt Elementa proportionis inter maximam A K, & minimam G B, toties differentia K M, *maximarum* K A, H E, *vel* M A, *continetur in menſurâ proportionis maximæ* K A, *ad minimam* B G.

Iam verò maximæ K A, *& minimæ* B G *differentia* K L *componitur ex differentiis* K M, M O, O L *binarum, & binarum deinceps ſitarum omnibus.*

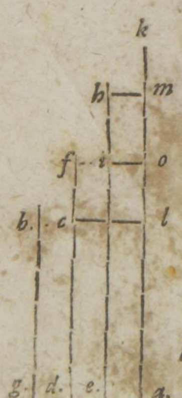
Sed quælibet differentia M O, O L, *binarum deinceps ſeorſim minor eſt differentia* K M *maximarum per 3. Prop. quare etiam totidem junctæ differentiæ binarum deinceps, id eſt, differentia* K L *maximæ* K A, *& minimæ* B G *erit minor quàm multiplex ipſius* K M *differentiæ maximarum, ſecundum numerum, elementorum proportionis ſectæ. Sed multiplex iſta eſt menſura proportionis inter maximam* K A, *& minimam* B G, *ut jam oſtenſum,*

ſtenſum. Ergò differentia K L maximæ & minimæ non æquat menſuram proportionis earum, poſitis quæ ſunt poſita.

In numeris ſic. Sint numeri 1000. 900. 810. 729. *continuè proportionales. Maximi ſunt* 1000. 900. *Eorum differentia eſt* 100. *Sit hæc menſura arbitraria proportionis* 1000. 900. *Erit igitur etiam menſura hæc proportionis* 900. 810. *& proportionis* 810. 729. *Compoſita igitur proportionis inter* 1000. *&* 729. *menſura erit* 300. *quia elementa æqualia proportionis tria ſunt, per duos medios proportionales per Axioma* 2. *Atqui terminorum hujus proportionis, ſcilicet* 1000. *&* 729. *differentia eſt* 271. *multò minor quàm* 300, *triplum ipſius* 100.

VI. PROPOSITIO.

In continuè proportionalibus, ſi differentia maximæ & unius minorum non deinceps ſequentis ſtatuitur menſura proportionis illarum: reliquæ proportiones, quæ quidem ſunt inter maximam, & unam prius aſcitâ majorem ſortientur menſuram minorem differẽtia ſuorum terminorũ: quæ verò proportiones ſunt inter quantitatem maximam & unam quamlibet, prius aſcitâ minorem, nanciſcentur menſuram majorem, quàm eſt differentia ſuorum terminorum.



Sint proportionales A K, E H, D F, G B, *& aſſumantur maxima quidem* A K, *& una minorum non deinceps* D F, *ſitq; illarum differentia* K O, *&* K O *menſuret quantitatem proportionis inter* A K *&* D F. *Et ſint aliæ quantitates,* E H *quidem major prius aſcitâ* D F; G B *verò illâ minor: & ſit* M K *differentia ipſarum* A K, E H; *ſic* H I, *vel* M O *ſit differentia ipſarum* E H, D F; *deniq;* F C *ſit differentia ipſarum* D F, G B. *Dico primò menſuram proportionis* A k, E H *fore minorem differentiâ terminorum* M k.

Nam quia proportio A k, D F, *menſuram accipit* k o, *eadem verò*

verò proportio habet partes æquales conſtitutas per mediam proportionalem E H, *per* 1. *Prop. Proportionis igitur* A K, E H *menſura erit dimidia ipſius* K O *per* 1. *Poſtul. (vel pars alia aliquota, ſecundum numerum interjectarum* E H.) *At differentia* M K *major eſt quàm* M O *reſidua de* K O *per* 3. *Prop. Major igitur quàm dimidium ipſius* K O. *Ergò & major, quàm ut poſſit eſſe menſura proportionis inter* K A & H E *majorem prius aſcitâ* F D.

Dico ſecundò Menſuram proportionis A K, G B *fore majorem differentiâ* L K. *Rurſum enim proportionis* E H, D F, *quæ ſemiſſis eſt ipſius* A K, D F, *menſura erit ſemiſſis ipſius* K O *per* 1. *Poſtul. vel pars alia aliquota, &c. At differentia* H I, *vel* M O *minor eſt quàm* M K *reſidua de* K O *per* 3. *Prop. Minor igitur* H I, *quàm dimidium ipſius* K O. *Ergò minor quàm menſura proportionis* E H, D F. *Sed differentia* F C *vel* O L *rurſum minor eſt, quàm differentia* M O *per* 3. *Prop. Plus igitur deficit* O L *menſura proportionis* D F, G B, *quàm* M O, *à menſura proportionis* E H, D F. *Eſt verò proportio* D F, G B, *æqualis proportioni* E H, D F, *quia hac quidem vice ipſi* D F *æquè propinqua eſt* G B *verſus minora, atq;* E H *verſus majora, & ſi hæc non eſſet, alia ſumi poſſit, quippe inter continuè proportionales. Deficit igitur* O L *à menſurâ proportionis* D F, G B, *ſed* K O *ſtatuitur eſſe ipſa menſura proportionis* A K, D F.

Cùm ergò proportio A K, G B, *compoſita ſit ex proportione* A K, D F, *& proportione* D F, G B, *per* AX. 1. *Menſura etiam illius compoſita erit ex menſuris harum; ut ſi proportio* D F, G B *ſemiſſis eſt ipſius proportionis* A K, D F, *& proportio* A K, G B *ſeſquialtera ipſius* A K, D F; *erit etiam ipſius* K O *ſuſceptæ menſuræ ſeſquialtera pro ipſius* A K, G B *proportionis menſura habenda.*

Similiter verò & K L *componitur ex* K O, O L; O L *verò demonſtrata eſt eſſe minor dimidiâ ipſius* K O: *Tota igitur* K L

minor eſt quàm ſeſquialtera ipſius k o, *minor igitur quàm menſura proportionis ſuæ inter* A k, G B.

Proportionales.	Differentiæ.
100000.	
90000.	-10000
81000.	-9000
72900.	-8100
65610.	-7290
59049.	-6561

Per numeros ſic: Sint continuè proportionales 100000. 90000. 81000. 72900. 65610. 59049. *Eligantur* 100000. 72900, *earumq; differentia* 27100 *ſtatuatur menſura proportionis terminorum. Cùm igitur hæc proportio habeat partes tres æquales, quarum una* 100000. 90000, *cum differentiâ* 10000: *altera* 90000. 81000, *cum differentia* 9000: *tertia* 81000. 72900, *cum differentia* 8100. *Qualibet vero proportionum harum ſit pars tertia ſuæ totius, valebit etiam tertiam partem menſuræ illius, ſcilicet* $9033\frac{1}{3}$. *hæc vero menſura Elementorum proportionis minor quidem eſt, quàm primorum terminorum differentia* 10000, *major vero quam ſecunda differentia* 9000, *major etiam multo quam tertia* 8100. *Conſequenter etiam major quam differentia* 7290, *numerorum* 72900, 65610: *quam & differentia* 6561. *numerorum* 65610. 59049. *Ac proinde proportionis* 100000. 90000 *terminorum differentia* 10000, *excedit menſuram ſuſceptam* $9033\frac{1}{3}$. *Nec minus etiam proportionis* 100000. 81000 *differentia* 19000 *excedit menſuram ſuam, ſcilicet duplum ipſius* $9033\frac{1}{3}$. *ſcilicet* $18066\frac{2}{3}$. *quia termini minores* 90000, & 81000 *adhuc ſtant ante primò adiunctum* 72900. *E contrario proportionis* 100000, 65610 *differentia* 34390 *minor eſt, quam illius menſura* $36133\frac{1}{3}$ *quadruplum ſcilicet ipſius* $9033\frac{1}{3}$. *Sic etiam proportionis* 100000. 59049 *differentia* 40951 *minor eſt quintuplo ipſius* $9033\frac{1}{3}$ *ſcilicet* $45166\frac{2}{3}$ *quia termini minores* 65610 & 59049 *ſtant poſt primo adiunctum* 72900 *utpote minores illo.*

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VII. PROPOSITIO.



Si quantitates aliquot ordine magnitudinis deinceps collocentur, binæ deinceps proportiones æquales facientes, ipſæ quantitates continuè proportionales erunt.

Collocentur deinceps A, D, B, E, C, *hoc ordine minores à primâ, ſintq́;* A B, *&* B C *proportiones æquales, dico* B *eſſe mediam proportionalem inter* A, C. *Si enim non: erit vel maior, vel minor mediâ proportionali; ſit maior illâ, & ſit verbi cauſa* E *ipſa media proportionalis. Erit igitur* A E *proportio maior quam* A B, *per* 1. *Ax. quare* E C *minor quam* A E. *At ſi* E *media proportionalis, tunc* A E *&* E C *proportiones ſunt æquales per* 1. *Prop. Non igitur minor erit media proportionalis quam* B.

Sit maior, & ſit D, *rurſum idem abſurdum ſequetur.*

Si ergo A B, B C *æquales proportiones, ipſa* B *eſt media proportionis, &c.*

VIII. PROPOSITIO.

Si quantitates quæcunq; deinceps collocentur, ordine magnitudinis, quarum, quæ intermediæ, non ſint inter proportionales medias, proportionis cujuſcunque, ſive actu continuatæ, ſive poteſtate continuandæ inter poſitione omiſſarum: intermediæ tales, proportionem extremarum non dividunt in commenſurabilia.

1. *Commenſurabilia enim ex eo dicuntur, quod habeant unam communem menſuram, quam quodlibet contineat ſecundum certum numerum aliquoties exactè, ſic ut nihil, quod eâ menſurâ minus ſit, reſtet reſiduum.* 2. *Jam vero menſura proportionum communis, eſt & ipſa aliqua proportio, minor utrâque menſurandâ.* 3. *Omnis vero proportio eſt inter duos terminos.* 4. *& Proportio repetitione ſui, menſurans aliam proportionem,* Definitiones.

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incipit ab uno menſurandæ termino, eiq; ſociat alium, pro ratione quantitatis ſuæ minoris: tum illo jam pro antecedenti ſumpto, ſtatuit alium conſequentem, hoc identidem, quoadusq; permeatur proportionis menſurandæ quantitas: non aliter, quam cum intervallo pedum Circini metimur lineam, fixo pede Circini in unâ lineæ extremitate, pede altero punctum ſignamus, deinde pede priore in hoc punctum tranſlato, punctum aliud altero pede metamur, verſus ulteriora, donec emenſi fuerimus totã lineam.

5. Et Proportio proportionem exactè menſurare dicitur, quando in hâc continuâ terminorum interpoſitione & coaptatione tandem ultimus terminus proportionis menſurantis, cum ſecundo termino menſuratæ coincidit in quantitate. Igitur identitas illa proportionis menſurandis continuè repetitæ efficit, terminos continuè proportionales per 7. Prop. Ergo ſi proportio aliqua duas proportiones exactè metitur, neceſſe eſt, ut termini, quos ipſa menſurans interponit, ſint cum ipſius menſurandæ terminis continuè propotionales. Si ergò nulla unquam, quantumvis parva proportio poteſt inveniri, quæ repetitione ſui, terminos ultimos aſſequatur proportionum menſurandarum, ſic ut tam major communis terminus, quàm duo minores proportionum menſurandarum ſint cum menſurantis terminis interpoſitis continuè proportionales: proportiones illæ ſunt inter ſe incommenſurabiles.

IX. PROPOSITIO.



Cum duæ longitudines effabiles non fuerint ad invicem, ut duo Numeri ejuſdem ſpeciei figurativæ, verbi cauſa, duo quadrati, aut duo Cubi: non cadent inter illas, longitudines aliæ effabiles, mediæ proportionales, numero tot, quot ipſa ſpecies poſtulat, verbi causâ, Quadrati unam, Cubi duas, Biquadrati tres, &c.

Sint enim duæ longitudines A D habentes, ſe quidem ad invicem,

vicem, ut numerus ad numerum, at non ut numerus Cubicus ad Cubicum: & quia de Cubo agimus, de duabus igitur mediis proportionalibus erit dicendum, ſint eæ B *&* C. *Dico* B *&* C *non eſſe longitudines effabiles.*

Si enim quis contendat eſſe effabiles, eſto hoc poſitum. Sunt igitur ut Numeri. Sunt autem ſimul mediæ proportionales inter A, D, *ex hypotheſi. Et quia etiam* A, D, *ſunt ut numeri, quippe effabiles, & ipſæ ſupponuntur, habent verò duas medias* B, *&* C, *ut numeros, quare per* 21. *octavi Eucl.* A *&* D *ſimiles erunt ſolidi: quare per* 27. *ejuſdem erunt ad invicem, ut Numerus ad numerum Cubicum. Hoc verò eſt contra primam propoſitionis hypotheſin. Falſum igitur poſitum fuit,* B *&* C *eſſe longitudine effabiles. Vera igitur eſt negatio in propoſitione comprehenſa.*

Eodem modo etiam de quadratis, & de unâ mediâ proportionali ratiocinari poſſumus, deductione ad impoſſibile: nec minus & de cæteris ſpeciebus, poſt quadratum & cubum ſequentibus.

X. PROPOSITIO.

Si ex aliquot quantitatibus effabilibus ordine magnitudinis invicem ſequentibus duæ extremæ non fuerint ad invicem, ut duo numeri quadrati, aut duo cubi, aut duo alii ejuſdem ſpeciei; intermediarum nulla dividet proportionem in commenſurabilia.

Nam niſi duæ quantitates effabiles recipiant media proportionalia effabilia, earum proportio non dividetur per effabilem intermediam in commenſurabilia per 8. Prop. At ſi duæ quantitates non fuerint inter ſe, ut duo numeri ejuſdem ſpeciei figurativæ, non recipiunt media proportionalia effabilia, per 9. Prop. Quare illæ intermediæ quas propoſitio admittit, cum ſint effabiles, non erunt ex proportionalibus mediis. Non igitur dividunt proportionem extremarum in commenſurabilia.

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XI. PROPOSITIO.

Omnes proportiones deinceps ordinatæ, quæ ſunt inter terminos effabiles æqualitate Arithmetica ſe invicem excedentes, inter ſe ſunt incommenſurabiles.

Nam termini extremi effabiles, vel recipiunt effabilem mediam proportionalem quantitatem unam pluréſve, vel non recipiunt. Si non recipiunt, nulla igitur effabili, & ſic neq; medio Arithmetico dividitur eorum proportio in commenſurabilia per 8. *Prop. Recipiant verò effabile medium proportionale, ut termini* 8 & 18, *recipiunt enim* 12 *effabilem, cum ſint ut* 4 *ad* 9, *quadratus ad quadratum. Eſt verò inter* 8.18, *medium Arithmeticum* 13, *ideo proportio* 8.13. *major eſt quàm* 8.12, & 13.18 *minor, quàm* 12.18, *quantitate utrinq; parvæ proportionis inter terminos* 12.13. *ſed proportio* 12.13, *nulli reliquarum eſt commenſurabilis. Nam termini* 8.13. *quia non ſunt ad invicem, ut numerus figuratus ad alium ejuſdem figurationis per* 10. *Prop. non capiunt mediam vel medias proportionales effabiles, quare numerus* 12 *non eſt unus ex iis numeris, qui inter* 8 & 13 *intercidunt in continua proportione: non eſt igitur commenſurabilis proportio* 8.13. *proportioni* 12.13. *vel* 8.12. *Sic ex iiſdem fundamentis, quia termini* 12.18. *non capiunt effabilem mediam proportionalem: ergo* 12.13 & 13.18 *ſunt incommenſurabiles, ad commenſurabilem igitur* 8.12. *ipſi* 8.18. *eſt appoſita incommenſurabilis* 12.13. *Tota ergo* 8.13 *eſt ipſi* 8.18 *incommenſurabilis. Sic in* 13.18. *de commenſurabili* 12.18. *dempta eſt pars incommenſurabilis* 12.13. *reſidua ergo* 13.18. *eſt incommenſurabilis ipſi* 12.18. *At neq; proportio inter* 8.13 *eſt commenſurabilis ipſi proportioni inter* 13.18, *quia tota inter* 8.18 *alterutri parti inter* 8.13 *eſt incommenſurabilis, ergo & partes invicem per* 16. *decimi Eucl. Item ſi eſſent partes commenſurabiles, menſuram utraq; communem haberet,*

atq;

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atq; illa etiam compoſitam inter 8. 18 *emetiretur, & ſic partes cum tota commenſurabiles eſſent; Atqui jam demonſtratum eſt, neutram partem toti eſſe commenſurabilem. Non ſunt igitur partes, quas hîc facit mediũ Arithmeticũ inter ſe commenſurabiles.*
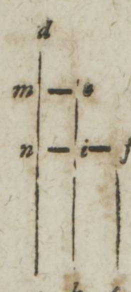
XII. PROPOSITIO.

Si quantitates quæcunq; deinceps collocentur ordine magnitudinis, proportionis verò inter maximas menſura ſtatuatur differentia inter eas, differentia inter quaſcunque alias, ex poſitis, minor erit menſurâ ſuæ proportionis; & ſi proportionis inter minimas menſura ſtatuatur differentia minimarũ: differentiæ reliquæ erunt majores menſurâ proportionis ſuorum terminorum.

Aut enim continuè proportionales ſunt quantitates collocatæ actu, vel poteſtate ſupplendi omiſſas, & tunc patet propoſitum per VI & per III. Aut non ſunt in proportione continua, ſic ut partes conſtituant incommenſurabiles: & tum conceptione mentis in infinitas particulas æquales ſecari intelligeretur per interpoſitas infinitas medias proportionales: ita redigentur cum iis, quæ actu ſunt continuè proportionales ad eandem vim demonſtrationis.

COROLLARIUM.

Quod ſi ſuperet menſura proportionis inter maximas, differentiam earum: hujus menſuræ ad hanc differentiam proportio minor erit, quàm ſequentis menſuræ ad differentiam ſuam: cum proportionalium eadem ſit ratio.



XIII. PROPOSITIO.

Si quantitates tres ordine magnitudinis ſe inſequãtur proportio minimarum duarum, in proportione extremarum continebitur rarius, quàm differentia minimarum in differentiâ extremarum: & viciſſim propor-

tio

tio maximarum in proportione extremarum continebitur ſæpius, quàm differentia illarum in differentiâ harum.

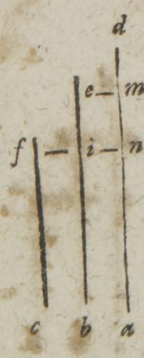
Contineatur enim in adiecto diagrammate differentia minimarum E I, *vel* M N, *in differentia* D N *extremarum aliquoties licet non exactè: & capiat proportio minimarum* B E, C F *menſuram differentiam* M N, *erit igitur proportionis* A D, C F *menſura minor quàm differentia* D N *per* 12. *rarius igitur continebitur* M N, *in menſura ipſius* A D, C F *proportionis, quàm in* N D *longiore; rarius igitur & ipſa proportio in proportione. Viciſſim contineatur* D M, *differentia in* D N *aliquoties: & ſit* D M *menſura proportionis* A D, B E. *Erit proportionis* A D, C F *menſura maior quàm* D N, *ſæpius igitur erit* D M, *in menſura ipſius* A D, C F, *quàm in* D N. *Ergo, &c.*

COROLLARIUM.

Differentia eadem inter terminos binos hinc majores, inde minores exiſtente: proportio inter majores minor erit, inter minores major.

XIV. PROPOSITIO.

Si quantitates tres ordinentur deinceps, æqualibus differentiis invicem excedentes: proportio inter extremas eſt major quàm dupla proportionis maximarum.



Sint tres quantitates, A D *maxima,* B E *media,* C F *minima, & ſit exceſſus primæ ſuper ſecundam* D M, *æqualis exceſſui ſecundæ ſuper tertiam* E I, *vel* M N. *Dico, proportionem inter* A D, C F, *maiorem eſſe quàm duplam ipſius inter* A D *ad* B E. *Menſuretur enim proportio* A D, B E *per differentiam* D M *per* 3. *Poſtul. Erit igitur menſura proportionis* B E, C F *maior quàm differentia* I E, *vel* N M *per* 12. *Sed* M N *æquat* D M *menſuram proportionis inter* A D, B E. *Ergo menſura proportionis* B E, C F

eſt

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eſt maior menſura proportionis A D, B E; *Et ſic ipſa proportio* B E, C F *maior eſt proportione* A D, B E. *Sed proportio* A D, C F *componitur ex proportione* A D, B E *& ex proportione* B E, C F *per Axioma* 1. *Ergo proportio* A D, C F *partes habet* A D, B E, *& eam maiorem* B E, C F, *maior igitur dupla ipſius* A D, B E.

COROLLARIUM.

Hinc ſequitur, ſemiſſem proportionis extremarum eſſe majorem proportione maximarum, minorem proportione minimarum.

XV. PROPOSITIO.

Si duæ quantitates proportionem conſtituerint, dimidium verò quantitatis majoris dematur de quantitate utrâq;, reſiduæ quantitates proportionem conſtituent majorem duplâ prioris.

Sint quantitates 10. 9. *& ablato dimidio ipſius* 10. *hoc eſt*, 5. *ex utraq;, relinquantur* 5. 4. *Dico, proportionem inter* 5. 4. *duplaipſius* 10. 9. *maiorem eſſe. Duplicentur enim* 5. 4. *fient* 10. 8. *eritq; proportio eadem* 5. 4. *quæ &* 10. 8. *Differentia vero* 10. 8. *hoc eſt* 2, *dupla erit differentiæ* 5. 4. *hoc eſt differentiæ* 10. 9. *ſcilicet* 1.

Si vero tres quantitates ordinentur 10. 9. 8. *quarum prima* 10. *excedat tertiam* 8, *duplo eius, quod excedit ſecundam* 9, *ſeu in quibus æquales ſunt exceſſus* 10. 9. *&* 9. 8. *proportio extremarum* 10. 8. *(id eſt* 5. 4.*) maior eſt dupla ipſius* 10. 9. *maximarum per* 14. *Ergo.*

XVI. PROPOSITIO.

Incommenſurabilium proportionũ partes aliquotæ ſunt inter ſe incommenſurabiles.

Nam pars aliquota eſt ſui toti commenſurabilis, at tota illa perhibetur toti ſociæ incommenſurabilis, ergo & pars unius toti

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alteri erit incommenſurabilis per 14. decimi Eucl. & pro eadem, & parti aliquotæ alterius.

XVII. PROPOSITIO.

Si mille numeri invicem ſuccedant ordine naturali, differentes bini unitate, initio facto à maximo 1000, deinde proportio inter maximos 1000. 999. biſectione continuâ ſecetur in partes minutiores, quàm eſt exceſſus proportionis inter proximos 999. 998, ſuper proportionem inter maximos 1000. 999: minimum verò illud Elementum proportionis, inter 1000. 999. capiat menſuram, differentiam inter 1000, & proportionalem illam mediam, quæ alter elementi terminus eſt: ulterius ſi proportio inter 1000. 998. ſeorſim ſecetur in partes duplo plures, quàm prior proportio inter 1000. 999, & hujus ſeparatæ diviſionis minimum elementum ſeorſim capiat menſuram, ſuorũ terminorum (quorum alter ſit 1000.) differentiam, eodemq; modo quælibet proportio ipſius 1000. ad ſequentes numeros, ut 997, &c. biſectione continuâ ſecetur in particulas tantæ magnitudinis, ut verſentur inter ſeſquiplum & dodrantem elementi, quod emerſerat ex ſectione proportionis primæ inter 1000 & 999. ſingulisq; elementis menſura detur à ſuorum terminorum differentiâ, maximè exiſtente 1000, & ſi hoc facto, cuicunque ex mille proportionibus, menſura conſtituatur ex tanto numero menſurarum elementi ſui, in quot elementa ipſa diviſa fuit: proportiones omnes, ad omnem calculi ſubtilitatem, emendatas exactasq; habebunt menſuras.

Nam ſuccedant invicem numeri 1000. 999. 998. *&c. ordine naturali, differentes unitate: erit inter maximas* 1000.

999,

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999, minima proportio: major inter proximos 999. 998: hæc iterum major proximâ inter 998. & 997. ſic ſemper & hoc per 14. Prop. Donec 500. 499. fiat major quàm dupla ipſius 1000. 999. per Prop. 15. Dico ſecundò exceſſum ſecundæ ſuper primam fore minimum: ſic ut ſemper exceſſus ſequentis ſuper præcedentem ſit major priore exceſſu: ut quoties ſequens proportio duplo longius diſtiterit à prima, quàm aliqua præcedentium, toties exceſſus ſequentis ſuper primam amplius quàm duplo major ſit exceſſu præcedentis. Fiat enim ut 1000 ad 999, ſic 999 ad 998 $\frac{001}{1000}$. Igitur proportio 999 ad 998 $\frac{1}{1000}$ eſt eadem quæ 1000 ad 999. Aufer illã à proportione 999. 998. relinquitur exceſſus 998010. 998000.

Fiat etiã ut 1000 ad 999, ſic 998 ad 997 $\frac{002}{1000}$. Igitur proportio 998 ad 997 $\frac{2}{1000}$ eſt eadem quæ 1000 ad 999. Aufer illam à proportione 998. 997. relinquitur exceſſus, proportio inter 997002. & 997000. At in priori exceſſu proportionis 998010. 998000, termini differebant per 1. in hoc verò exceſſu termini 997002. 997000 differunt per 2. Atqui ſi æquales fuiſſent majores termini hîc & illîc, proportio ſequens, ubi dupla differentia prioris, fuiſſet major dupla ipſius per 14. Multò igitur major erit proportio, ubi etiam minor fuerit terminus, qui proportioni ſequenti eſt loco majoris ſcilicet 997002.

Lucis cauſa ſint numeri minores & pauciores, & qui etiam unitate differant, ut: 10. 9. 8. 7. 6. 5. 4. 3. 2. 1. Dico exceſſum proportionis 8. 7. ſuper proport. 10. 9. amplius quàm duplo majorem eſſe quàm exceſſum proportionis 9. 8. ſuper eandem 10. 9. Reducatur enim ut prius prima proportio inter 10. 9. cum ſingulis ſequentium, quas bini deinceps numeri conſtituunt, reducantur,

inquam, ad communem terminum maximum. Hic etiam exceſſuum termini differunt magis, magisq́ʒ, ut quia 72.70. eſt loco ſecundo, differentia 2 (ut prioris 1, inter 81. 80, dupla) indicat exceſſum 72.70. eſſe majorem duplo ipſius 81. 80. Sic 54. 50. loco quarto major duplo eſt ipſius 72. 70 loco ſecundo. Sic 18. 10 loco octavo major duplo ipſius 54.50. indice differentia 8, dupla ipſius 4, inter terminos minores.

	Eſt	*At proportio inter 10. 9. valet*	*Exceſſus illarum.*
10. 9.	100.90.	100. 90.	
9. 8.	90. 80.	90. 81.	81. 80.
8. 7.	80. 70.	80. 72.	72. 70.
7. 6.	70. 60.	70. 63.	63. 60.
6. 5.	60. 50.	60. 54.	54. 50.
5. 4.	50. 40.	50. 45.	45. 40.
4. 3.	40. 30.	40. 36.	36. 30.
3. 2.	30. 20.	30. 27.	27. 20.
2. 1.	20. 10.	20. 18.	18. 10.

Cùm igitur in priori exemplo mille numerorum, minimus exceſſus ſit 998001. 998000. facilè ſecamus proportionem primã 1000. 999. in partes æquales, minores, poſito exceſſu numero. Reducatur enim ille exceſſus ad terminum minorem dividendæ, fiat ſcilicet ut 998000 ad 998001, ſic 999000000000 ad 999001002004. &c. unde apparet differentiam terminorum fieri 1002004. &c: quæ eſt paulò major quàm milleſima pars de differentia terminorum proportionis primæ. Ergò per 13. non totupla pars proportionis 1000. 999 eſt in exceſſu proportionis ſequentis 999.998.

Quæ

Quæratur ergò medium proportionale inter 1000.999. Id ſecabit proportionem terminorum, in æquales duas partes, per 1. Prop. quæratur ſecundò inter hanc inventam mediam, & 1000 alia media proportionalis, ut ita prior media intelligatur, circumdata duabus mediis proportionalibus aliis, quarum tamen unius ſolum, verſus terminum 1000. inveſtigatione opus eſt. Per has igitur tres medias (ut eſt in Ax. 2.) ſecabitur proportio in partes 4. Sic proportionalis tertia inter prius inventam, & 1000. ſecabit in partes 8. quarta in 16, & ſic conſequenter (per Poſtul. 2.) in 32.64.128.256.512.1024. quod fit actu decimo. Hic itaq; numerus 1024. certò conſtituit particulas proportionis 1000.999. minores ſupra inveſtigato exceſſu: quia proportio capit hujus exceſſus minus quàm mille; hic verò conſtituuntur mille viginti quatuor particulæ. Hic igitur particula milleſima viceſima quarta capiat loco menſuræ, differentiam termini ſui minoris, ſeu mediæ proportionalis decimæ à termino majore 1000. per 3. Poſtulat.

Pergimus ad ſimilem ſectionem proportionis inter 1000. 998. Hæc igitur eſt incommenſurabilis priori 1000.999. Nam per 11. Prop. proportio 999.998. eſt incommenſurabilis proportioni 1000. 999. qui termini bini differunt unitate æqualiter, ſed proportio 1000.998. componitur ex illis inter ſe incommenſurabilibus per Axiom. 1. Cum verò totum in incommenſurabilia ſecatur, ipſum ſingulis eſt incommenſurabile per 17. decimi Eucl.

Eſt verò hæc proportio 1000. 998. major quàm dupla prioris 1000. 999. exceſſu incommenſurabili, ut ſupra allegatione præmiſſæ 14 indicatũ. Pars igitur ejus milleſima vigeſima quarta plus quàm duplo major eſt minimo elemento prioris; biſecetur igitur, ut totius fiant partes 2048. per inquiſitionem undecimæ proportionalis. Tunc ſanè elementũ hoc ejus erit proximè æquale

 ele-

elemento minimo prioris, majus tamen illo etiamnum, & illi incommenſurabile per 16. præmiſſam.

Si ergò illud accepit menſuram, differentiam ſuorum terminorum, hoc jam elementum proportionis, quippe majus illo, menſuram habebit majorem differentiâ ſuorum terminorum, per 12. Prop. Ac proinde ſi prioris elementi terminorum differentia multiplicetur 1024ies pro menſurâ proportionis inter 1000. 999 tunc poſterioris elementi terminorum differentia, multiplicata 2048ies, adhuc minor erit menſurâ proportionis inter 1000. 998.

Veruntamen ſi attendamus ad quantitatem hujus defectus, illa eſt omninò ſubtiliſſima, & nullâ calculi diligentiâ obſervabilis. Quia enim proportio inter 1000. & 999 ſecta eſt in particulas plus quàm mille, & elementi tam parvi menſura conſtituta eſt differentia terminorum 1000000. & 999999. ſcilicet 1. & minor adhuc certè proportio proxima inter 999999. 999998. major priori per 12. Prop. Menſuram habebit, quæ excedat terminorum differentiam primam vix millies milleſimâ ſui; Ac proinde compoſita proportio 1000000. 999998. major eſt dupla prioris vix millies milleſimâ prioris particulâ. At jam elementum ſecundæ proportionis inter 1000. 998. in ſuperioribus conſtitutum, nequaquam eſt majus duplo prioris proportionis elemento; ſed ob idipſum factæ ſunt partes, non 1024. ſed 2048. ut eſſet pars iſta proximè æqualis priori, quomodo excedit illam rurſum vix milleſima parte illius, ſi ergò totum ſuperadderet differentiæ ſuæ millies milleſimam, ad conſtituendam proportionis menſuram, pars utique milleſima totius non plus addet, quàm millies milleſimæ prioris elementi milleſimam.

Tranſeamus ad ſectionem ſequentis Proportionis inter 1000. 997. Hæc verò eſt paulò major quàm tripla primæ inter 1000. 999.

999. Quare ſi ſecetur in æquales 1024. particulas: particula talis etiam erit paulò major quàm tripla elementi primi. Sin ulterius illæ biſecentur per undecimam proportionalem, exiſtent numero 2048. eritq; unaquælibet major quàm ſeſquialtera primi elementi. Nam triplæ dimidia eſt ipſa ſeſquialtera totius. Quia ergò ſuperant primum elementum plus quàm dimidio ipſius, biſecentur denuò conſtitutione duodecimæ proportionalis, ut fiant partes 4096: quælibet major dodrante prioris elementi, quia ſeſquialteri dimidium eſt dodrans. Satis igitur appropinquat elemento priori. Si igitur huic elemento proportionis tertiæ menſura ſeorſim ponatur, differentia terminorum ipſius, peccabit quidem illa exceſſu, per 12. præmiſſam, at peccato nunquam æſtimabili, ob cauſas in ſecundæ ſectione dictas.

Hoc pacto proportio inter 1000. 996. per ſectionem in 4096. paulò majus ſortitur elementum, quàm eſt elementum primæ, & proportio inter 1000. 995. paulò majus quinq; quantis primi elementi. At proportio inter 1000. 994 jam per tredecimam proportionalem, capere debet partes 8192. ut ſint rurſum paulò majores dodrante primi elementi. Et proportio inter 1000. 993. paulò majores habebit ſeptem octavis primi, & proportio inter 1000. 992. rurſum paulò maiores primo elemento.

Hoc igitur tantiſper obtinet, quoad numeri ordinis millenarii proximi invicem appropinquaverint magis ipſi 500. dimidio primi, quàm ipſi primo 1000.

Nam quia proportio inter 500. 499 maior eſt quàm dupla proportionis inter 1000. 999. per 15. præmiſſam: Jam igitur exceſſus ipſius 500. 499 ſuper ipſam 1000. 999. ſuperat ipſam 1000. 999 quare in ſectione proportionum, quæ proximè antecedunt proportionem inter 500. & 499: per unam ſuperabundantem, biſectionem, vel etiam quadriſectionem, redigendum

eſt

eſt elementum, emergens ad propinquitatem elementi prioris in propoſitione præfinitam. At in iis quæ ſequuntur proportionem inter 501. *&* 500. *ſectione porrò non eſt opus. Nam quia proportio inter* 500. 499. *eadem eſt quæ inter* 1000. 998. *iccirco ſi fuerit notificata* 1000. 998. *&* 100. 500. *noſcetur etiam compoſita ex utraq;* 1000. 499. *ſine ſectione laborioſa. Igitur inquiſitio proportionalium deſinit in proportione dupla, ſcilicet inter* 1000. *&* 500.

XVIII. PROPOSITIO.



Cognitâ proportione numeri cujuſcunque ad primum 1000: ſimul cognoſcitur etiam numerorum reliquorum continuæ ejuſdem proportionis, ad eundem primum 1000. proportio.

Nota ſit menſura proportionis inter A *&* B. *Et ſit ut* A *ad* B, *ſic* B *ad* C, *&* C *ad* D, *&* D *ad* E. *Erunt igitur æquales menſuræ proportionum harum ſingularum ei, quæ eſt primò notæ* A *ad* B *per* I. *Poſtul. Iam verò proportio* A *ad* C *componitur ex proportionibus* A *ad* B, *&* B *ad* C, *per* I. *Ax. quare & menſura proportionis* A C *componetur ex duarum proportionum* A B, *&* B C *menſuris. Id eſt, menſura ipſius* A B *duplicata, dat menſuram ipſius* A C, *triplicata ipſius* A D, *quadruplicata ipſius* A E.

Hoc pacto cognitâ proportione inter 1000. 900. *cognoſcitur etiam ipſius* 1000. *ad* 810, *& ad* 729.

Et ex 1000. *ad* 800. *etiam* 1000. *ad* 640. *& ad* 512.
Et ex 1000. *ad* 700. *etiam* 1000. *ad* 490. *& ad* 343.
Et ex 1000. *ad* 600. *etiam* 1000. *ad* 360 *& ad* 216.
Et ex 1000. *ad* 500. *etiam* 1000. *ad* 250. *& ad* 125.

COROLLARIUM.

Hinc oritur præceptum quadrandi, cubicè multiplicandi, &c. & viciſſim radicem quadratam, cubicam, &c. extrahendi in primis nume-

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numerorum figuris. Eſt enim ut Maximus Chiliadis tanquam denominator ad Numerum propoſitum tanquam numeratorem ſic hic ad fractionis quadratum, & hoc ad cubum.

XIX. PROPOSITIO.

Cognita proportione numeri ad primum 1000; ſi duo alii in eâdem inter ſe proportione fuerint; eorum unius proportione ad 1000. cognitâ, noſcetur etiam reliqui proportio ad eundem 1000.

Sit A 1000, *& nota menſura proportionis* A *ad* B. *Sit verò ut* A *ad* B, *ſic* C *ad* D, *& ſit nota menſura proportionis* A *ad* C. *Dico, etiam innoteſcere menſuram proportionis* A *ad* D. *Quia enim nota eſt menſura ipſius* A B *proportionis, nota etiam erit ipſius* C D *proportionis, ut quæ illi ponitur æqualis, per* 1. *Poſtul. Nota verò eſt etiam* A C; *&* A D *eſt compoſita ex* A C *&* C D, *per* 1. *Ax. quare etiam menſura ipſius* A D *componetur ex menſurâ ipſius* A C, *ut ex menſurâ ipſius* C D, *id eſt, ipſius* A B.

COROLLARIUM I.

Hoc pacto ex notificatis proportionibus quindecim, prop. 18. præmiſſis, noſcentur aliæ centum viginti, Numerorum intra millenarium, ad ipſum millenarium.

Quoties enim datæ fuerint proportiones ad 1000. *duorum numerorum talium, in quibus vel ambobus, duos ultimos locos habuerint cyphræ, ut* 900. 800, *vel in eorum altero quidem duos, in reliquo verò unum, ut* 700. 810, *vel ut* 700. 10. *Vel ſi unum ſolum, eumque ultimum in utroque numero locum ex tribus obtinuerit cyphra: quæ tamen hanc cyphram antecedit figura in altero numero, ex paribus in reliquo quinarius fuerit, ut* 620. 950. *ſic*

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620. 50. ſic 20. 950. vel ſi alter quidem cyphrâ in ultimo loco caruerit, ex paribus tamen fuerit ut 512. 12. vel 2. reliquus fuerit 500. Omnibus hiſce caſibus inſtitutâ multiplicatione numerorum, proveniunt in fine tres cyphræ, quibus abjectis formatur numerus, unus ex mille ordinis naturalis, ſeu progreſſionis Arithmeticæ.

COROLLARIUM II.

Hinc oritur præceptum tractandi regulam trium, quando uno loco occurrit rotundus 1000.

Nam ſi ille occurrit primo loco in tali ſitu:

A 1000. *dat* B, *quid* C?

Tunc additur menſura proportionis A B, *ad menſuram proportionis* A C, *ita fit menſura proportionis* A D. *Sin autem* 1000. *occurrat loco ſecundo vel tertio, in tali ſitu* B *dat* A 1000, *quid* C? *vel tali* B *dat* C, *quid* A 1000?

Tunc aufertur menſura proportionis A B, *à menſura proportionis* A C, *vel ejus multiplicis proximè majoris, ita relinquitur menſura vel ipſius proportionis* A D, *vel ejus æquè multiplicis.*

XX. PROPOSITIO.

Quando fuerint ut primus ad ſecundum, ſic tertius ad quartum, notæ verò fuerint proportiones ipſius 1000. ad tres priores, innoteſcet etiam proportio ejuſdẽ 1000. ad quartum

Sit enim A 1000, *& ſit ut* B *ad* C, *ſic* D *ad* E. *Notæ verò ſint proportiones* A B, A C, A D; *Dico innoteſcere etiam proportionem* A E. *Nam quia ut* B *ad* C, *ſic* D *ad* E, *æqualis eſt igitur* men-

menſura proportionis B C, *menſuræ proportionis* D E. *Sed* B E *eſt compoſita ex* B D, D E *per* 1. *Axiom. Aequalis igitur erit proportio* B E, *proportionibus* B D, B C *ſimul ſumptis. Sed &* A E *eſt compoſita ex* A B, B E: *ſic* A D *ex* A B, B D, *ſic* A C, *ex* A B, B C *per* 1. *Axioma. Si ergò pro* B D, B C, *ſumantur proportiones notæ* A D, A C, *tunc* A B *bis acceſſit. Viciſſim ſi pro* B E *ſumatur* A E *proportio quæſita, tunc* A B *ſemel tantum acceſſit. Si ergò à junctis* A D, A C *notis, abſtuleris* A B *notam ſemel, relinquitur* A E *proportio quæſita.*

COROLLARIUM I.

Hâc methodo præterquam quod ſuperiorum Chiliades multæ iteratò exquiruntur, accedunt illis inſuper aliquot aliæ.

COROLLARIUM II.

Hinc oritur præceptum tractandi Regulam trium, quando nuſpiam occurrit rotundus 1000, ut ſi ſic:

Collocentur tres: B *dat* C, *quid* D?

Nam additur menſura proportionis A C, *menſuræ proportionis* A D, *& à ſummâ aufertur menſura proportionis* A B, *vel ejus aliqua pars aliquota: ita relinquitur menſura proportionis* A E, *vel ejus æquè multiplex.*

DEFINITIO.

Menſura cujuslibet proportionis inter 1000. & numerum eo minorem, ut eſt definita in ſuperioribus, expreſſa numero, apponatur ad hunc numerum minorem in Chiliade, dicaturq; LOGARITHMUS ejus, hoc eſt, numerus (*ἀριθμὸς*) indicans proportionem (*λόγον*) quam

D 2 habet

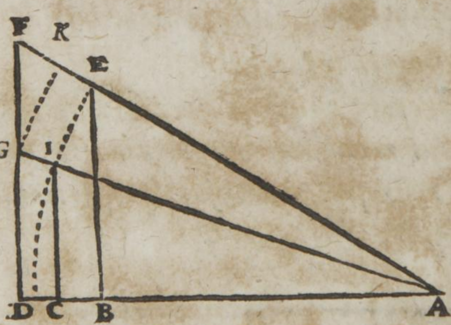
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habet ad 1000. Numerus ille, cui Logarithmus apponitur.

XXI. PROPOSITIO.

Si primus numerus ſit ſemidiameter Circuli ſeu Sinus totus: omnis numerus minor, ut Sinus complementi alicujus arcus, Logarithmum habet majorem ſagittâ arcus, minorem verò exceſſu ſecantis arcus ſupra radium ſeu ſemidiametrum, excepto unico proximo poſt ſemidiametrum, quia illius Logarithmus ex hypotheſi eſt æqualis ſagittæ.

Sit A *centrum circuli,* A D *ſemidiameter,* D I, D E *arcus, eorumque Sinus* I C, E B, *Sinus verò complementorum ſint* C A, B A, *ſagittæ* C D, B D. *Sit autem ut* A D *ad* A C, *ſic* A C *ad* A B. *Amplius ſint eorundem arcuum ſecantes* A G, E F, *per terminos* I. E, *in tangentes* D G, D F *educti, & ipſi* A G *æqualis abſcindatur ab* A F, *quæ ſit* A K, *denique ſit* C D *menſura proportionis* C A, A D, *ut minimi elementi arbitrarii. Dico, menſuram proportionis* B A *ad* A D, *hoc eſt, Logarithmum ipſius* B A *majorem eſſe quàm* B D, *minorem verò quàm* E F, *Quod major ſit quàm* B D, *demonſtratum eſt ſuprà propoſitione duodecima. Quod verò minores ſint menſuræ proportionum harum* I G. C F *ſic probatur. Primum de* C A, *cum ipſa* C D *ſagitta, utpote in minimo*



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nimo proportionum elemento ponatur eſſe Logarithmus ipſius C A : C D *ſanè eſt minor quàm* I G. *Vt enim* C A *ad* A D, *ſic* I A, *hoc eſt*, D A *ad* A G, *quia* D G *&* C I, *parallelæ. Eſt igitur* A D *media proportionalis inter* C A, *&* A G. *Vt igitur* C A *ad* A D, *ſic differentia* C A, A D, *hoc eſt*, C D *ad differentiam ſequentem* D A, A G, *hoc eſt*, *ad* I G. *Sed* C A *eſt minor quàm* A D, *ergò &* C D *eſt minor quàm* I G, *Sed* C D *eſt Logarithmus ipſius* C A *Sinus complementi arcus* I D, *&* I G *eſt exceſſus ſecantis eiuſdem arcus. Ergò Logarithmus minor eſt hoc exceſſu.*

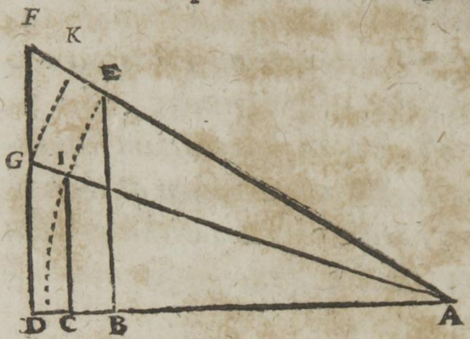
Tranſeamus ad B A: cuius Logarithmus maior eſt quàm B D, demonſtrandum eſt, illum non eſſe tantò maiorem ipsâ B D, quin interim maneat minor ipſo E F. Rurſum igitur A D eſt media proportionalis inter B A & A F. Et quia poſita eſt ut B A ad A C, ſic C A ad A D: quare etiam ut E A ad A G, vel A K, ſic K A, vel G A ad A F. Sunt igitur continuè proportionales iſtæ A B, A C, A D, A K, vel A G & A F. In eâdem igitur proportione ſunt etiam B C, C D, I G, vel E K & K F. Minor verò eſt C D, quàm I G, ut prius oſtenſum, minor igitur erit etiam I G vel E K, quàm K E. Tota igitur E F, maior eſt quàm dupla ipſius I G, multò magis igitur E F maior erit quàm dupla ipſius C D minoris. At proportionis inter B A, A D, ut quæ dupla eſt ipſius B A, A C per 1. *propoſitionem menſura ſeu Logarithmus ipſius B A, eſt præcisè duplus ipſius C D per* 1. *Poſtul. Minor eſt ergo Logarithmus ipſius B A exceſſu ſecantis E F. Erat autem maior ſagittâ B D. Patet ergo propoſitum.*

XXII. PROPOSITIO.

Iiſdem poſitis, ſagitta arcus cum exceſſu ſecantis ſuperat duplum Logarithmi, ad Sinum complementi apponendi.

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Sit enim primo Sinus complementi longiſſimus, aut longiſſima mediarum proportionalium, quibus aliqua proportio dividitur in partes arbitrario numero multas: ſic ut eius, verbi cauſa, A C reſiduum C D, ſeu ſagitta arcus I D ſit ipſiſſima menſura arbitraria proportionis C D, Logarithmus igitur ipſius C A eſt C D. At I G eſt maior ipsâ C D. Juncti igitur exceſſus ſecantis I G, & ſagitta C D plus efficiunt, quàm duplum ipſius C D.



Sit deinde alia quæcunque minor linea proportionis continuæ, ut A B, & educta ex B perpendiculari in circumferentiam E, connexisq; A E, & D G continuatis in F, ſit E F exceſſus ſecantis, & B D ſagitta eiuſdem ſcilicet arcus E D. Dico iunctos E F & B D, facere plus quàm duplum, Logarithmi ad B A apponendi, ſeu menſuræ ipſius B A, A D proportionis.

Quia eſt ut B A ad A D, ſic D A ad A F, & C A media proportionalis inter B A, A D, ut igitur B A ad A C, ſic G A ad A F, quare per 25. quinti Eucl. B A, A F iunctæ ſunt longiores iunctis C A, A G, ſive quia, ut B A ad A D, ſic D A ad A F, quare B A, A F iunctæ, ſuperant D A, A D duas medias. Vt verò B A ad A C, ſic etiam B C ad C D, & I G ad K F per 2. prop. quare etiam B C & K F iunctæ, ſuperant C D & I G iunctas. At C D, I G plus ſunt quàm duplum ipſius C D. Ergò B C, K F iunctæ, multò plus ſunt, quàm duplum ipſius C D. Et ſic B D, E F plus ſunt quàm quadruplum ipſius C D. Sed duplum ipſius C D eſt Logarithmus ſeu menſura proportionis B A, A D per 1. Poſtul. Ergò B D, E F iunctæ, plus ſunt quàm duplum Logarithmi ipſius B A, ſeu menſuræ proportionis B A, A D.

Sit

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Sit tertiò proportio B A, A C *minor vel major quàm* C A, A D, *demonſtrabitur nihilominus quod junctæ* B C, K F, *ſuperent duplum tantæ partitionis de* C D, *quanta portio eſt proportio* B A, A C, *proportionis* C A, A D.

COROLLARIUM.

Logarithmus Sinus complementi eſt minor medio Arithmetico inter ſagittam & exceſſum ſecantis.

PRÆCEPTUM.

Sinus inventi in Canone Sinuum reſiduum ad totum adde exceſſui ſecantis complementi, ſummæ dimidium ſuperat Logarithmum, ſagitta ipſa proximè minor eſt Logarithmo.

Eſto Sinus	99970. 1490	*Arcus*
Ejus reſiduum	29. 8510	{ *Sagitta arcus complementi minor Logarithmo*
ad ſin. totum	29. 8599	*Exceſſus ſecantis.*
	59. 7109.	*Summa.*
	29. 8555.	*Dimidium majus Logarithmo.*

Ergò Logarithmus eſt inter { 29. 8510. / 29. 8555.

PRÆCEPTUM ALIUD.

Invento Sinus Logarithmo, invenies etiam proximè Logarithmum Numeri rotundi, qui ſinu tuo ſcrupuloſo proximè minor eſt, ſi ſinus ſcrupuloſi exceſſum ſupra numerum rotundum adjeceris Logarithmo Sinus invento.

Vt quia ſinus 99970. 149, *Logarithmus inventus eſt* 29. 854 *circiter, ſi jam vis ſcire Logarithmũ rotundi* 99970. 000, *vides exceſſum tui Sinus ſcrupuloſi eſſe* 149. *hunc adde ad inven-*

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tum Sinus Logarithmum, *obſervato puncto. Sic* 29.854.

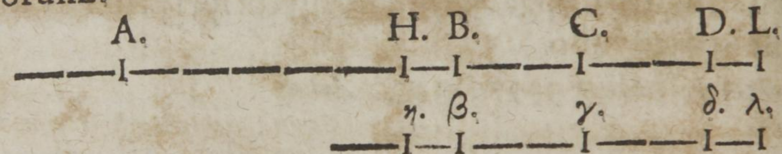
.149.

30.003. *Hic*

eſt Logarithmus *rotundi numeri* 99970.000. *proximè.*

XXIII. PROPOSITIO.

Si tres quantitates invicem ſucceſſerint, æqualibus exceſſibus differentes, menſura proportionis inter maximam & mediam, cum menſurâ alterius inter mediam & minimam conſtituet proportionem, majorem quidem proportione majorum, minorem verò proportione minorum.



Sint tres quantitates AD, AC, AH, *æqualibus exceſſibus* DC, CH; *Sit autem menſura proportionis* DA, AC *linea* δγ, *menſura verò proportionis* CA, AH, *linea* γη. *Dico, proportionem ipſius* δγ *ad* γη *maiorem quidem eſſe proportione ipſius* CA *ad* AD, *minorem verò proportione ipſius* HA *ad* AC. *Fiat enim ut* DA *ad* AC, *ſic* CA *ad* AB. *Vt igitur* DA *ad* AC, *ſic* DC *ad* CB *per* 2. *Prop. Sed longior eſt* DA, *quàm* AC, *longior igitur* DC, *quam* CB, *longior igitur & CH, quàm* CB, *differentia BH.*

Cum igitur æquales ſint proportiones DA, AC *&* CA, AB, *per* 1. *prop. menſura verò ipſius* DA, AC *ſit linea* δγ, *habebit &* CA, AB *menſuram æqualem ipſi* δγ, *per* 1. *Poſtul. Et cum proportio* CA, AH *ſit compoſita ex proportione* CA, AB *& proportione* BA, AH. *Maior igitur erit proportio* CA, AH, *quàm proportio* DA, AC, *æqualis ipſi* CA, AB. *Maior igitur etiam menſura eius* γη, *quàm* γδ. *Abſcindatur à* γη, *æqualis ipſi* γδ, *quæ ſit* γβ, *reſi-*

dua

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dua igitur $\beta\eta$, menſura erit reſiduæ proportionis BA, AH. *Erit autem proportio $\gamma\beta$ ad* CB *minor quam $\beta\eta$ ad* BH *per 12. Coroll. id eſt, maior eſt $\beta\eta$ reſpectu $\beta\gamma$ vel $\gamma\delta$, quam* HB *reſpectu* BC. *Compoſitis igitur terminis, illic $\gamma\beta$ & $\beta\eta$ in $\gamma\eta$, hic* CB *&* BH *in* CH, *maior erit $\gamma\eta$ reſpectu $\gamma\beta$, vel eius æqualis $\gamma\delta$, quam* CH *reſpectu* CB. *Maior igitur eſt proportio inter $\delta\gamma$, $\gamma\eta$, quam inter* BC, CH, *id eſt*, CD.

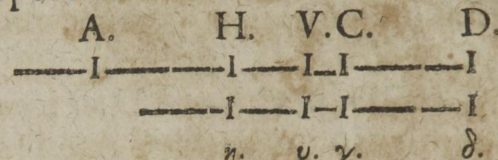
Vt verò BC *ad* CD, *ſic* CA *ad* AD *per 2. prop. Maior igitur proportio inter $\delta\gamma$, $\gamma\eta$, quam inter* CA, AD. *Sed $\delta\gamma$, & $\gamma\eta$, ſunt menſuræ, illa quidem proportionis inter* DA, AC *maiores, hæc verò proportionis inter* CA, AH *minores. Ergo proportio menſurarum maior eſt proportione terminorũ minorum.*

Rurſum fiat ut HA *ad* AC, *ſic* CA *ad* AL. *Vt igitur* HA *ad* AC, *ſic* HC *ad* CL, *per 2. Sed brevior eſt* HA, *quam* AC, *brevior igitur* HC, *hoc eſt* DC, *quam* CL, *differentia* DL. *Cum igitur æquales ſint proportiones* HA, AC, *&* CA, AL, *per 1. Prop. Menſura verò ipſius* HA, AC, *ſit linea $\eta\gamma$, habebit &* CA, AL *menſuram æqualem ipſi $\eta\gamma$, per 1. Poſtul. Eſto $\gamma\lambda$. Minor verò erat proportionis* CA, AD *menſura, puta $\gamma\delta$, minor igitur eſt $\gamma\delta$, quam $\gamma\lambda$. Exceſſus igitur $\delta\lambda$ erit menſura proportionis inter* DA, AL, *appoſitæ ad proportionẽ inter* CA, AD. *Et quia termini* DA, AL, *ſunt longiores quam* CA, AD, *quare per 12. Coroll. minor eſt $\delta\lambda$ reſpectu $\lambda\gamma$, vel $\gamma\eta$, quam* DL *reſpectu* LC. *Maior igitur reſidua $\gamma\delta$ reſpectu $\gamma\lambda$, vel $\gamma\eta$, quam* CD, *vel* HC, *reſpectu* CL. *Et quia proportio minuitur, cuncto minori termino, per Ax. 1. Minor igitur eſt proportio inter $\delta\gamma$, $\gamma\eta$, quam inter* HC, CL. *Vt vero* HC *ad* CL, *ſic termini trium minores* HA *ad* AC, *per 2. converſam. Minor eſt igitur Proportio inter $\delta\gamma$, $\gamma\eta$ menſuras proportionum, quarum unam*

facit maior terminus cum medio, alteram medius cum minimo, quam inter terminos minores.

XXIV. PROPOSITIO.

Dicta proportio inter duas menſuras, eſt minor dimidiâ proportione inter terminos extremos.



Sint enim termini extremi, ut prius AH, AD, *Media duo, Arithmeticum* AC, *Geometricum* AV, *ſit proportionis* DA, AC *menſura δγ, vel æqualis ipſi* DC, *vel etiam maior per Poſtul.* 3. *& applicetur ipſi δγ, alia γυ, quæ ſit menſura iuſta proportionis* CA, AV, *ut ſic tota δυ menſuret proportionem* DA, AV, *reſiduæ igitur proportionis* VA, AH *menſura, erit priori δυ æqualis, per* 1. *Poſtul. &* 1. *Prop. ſit ea υη: Quia igitur δγ eſt vel æqualis, vel maior quam* DC, *ſequentis γυ, proportio ad* CV, *erit maior quàm proportio ipſius γδ ad* CD, *& tertiæ υη proportio ad* VH *rurſum erit major quàm ſecundæ γυ, ad ſecundam* CV. *Et per compoſitionem totius ηδ ad totam* HD *major erit proportio, quàm partis υγ ad partem* VC. *Permutatim igitur major erit proportio totius ηδ termini majoris in priori, ad υγ majorem, in poſteriori, quàm totius* HD *termini minoris, in priori proportione ad* VC *terminum minorem in poſteriori. Sed tota ηδ conſtat ex terminis ηγ, γδ, quorum differentia γυ, ſimiliter* DH, *conſtat ex terminis* DV, VH, *quorum differentia* VC: *Major igitur eſt proportio terminorum ηγ, γδ, junctarum, ad ſuam differentiam γυ, quàm terminorum* DV, VH, *ad differentiam* VC. *At verò auctâ proportione ſummæ terminorum, ad ſuam differentiam, minuitur ipſorum inter ſe terminorum*

ſeor-

ſeorſim poſitorum proportio, per Coroll. 4. 13. *& communem notitiam, quod proportionalium eadem ſit ratio: Minor eſt itaque proportio inter* $\eta\gamma$, $\gamma\delta$, *quàm inter* DV, VH. *Sed proportio* DV *ad* VH *eſt æqualis proportioni* DA *ad* AV *per* 2. *Hæc verò* DA *ad* AV *proportio eſt dimidia ipſius* DA *ad* AH *per* 1. *Prop. Minor eſt ergò proportio inter* $\eta\gamma$, $\gamma\delta$, *menſuras proportionum* HA, AC *&* CA, AD, *quàm dimidia inter terminos* HA, AD.

EXEMPLUM HIC EST.

Numeri.	*Numerorum differentia.*	*Logarithmi.*	*Logarithmorũ differentia, ſeu menſura proportio*
1000.		00.	
	---250.		28768.21.
750.		28768.21.	
	---250.		40546.51.
500.		69314.72.	

Si verò fiat ut 1000. *ad medium proportionale inter terminos extremos* 1000. & 500. *(id eſt, ad* 70710.68.*) ſic menſura proportionis prioris, quæ eſt* 28768.21. *ad aliquem; Is prodibit* 40684.40, *major quàm menſura proportionis prioris.*

Si verò fiat ut Medium proportionale inter 1000. *&* 360. *(id eſt, ut* 600.*) ad* 1000. *Sic menſura proportionis poſterioris* 63598.86. *ad aliquem, is prodibit* 38159.32. *minor quàm menſura proportionis prioris inter* 1000. *&* 600.

ALIUD EXEMPLUM.

1000.		0.	
	320.		38566.25.
680.		38566.25.	
	320.		63598.86.
360.		102165.11.	

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COROLLARIUM.

Cum igitur medium Arithmeticum diſpeſcat proportionem in partes inæquales, quarum una major eſt ſemiſſe totius, altera minor, ſi quæratur, quæ ergò ſit ipſarum proportionum proportio inter ſe, reſpondetur, quod ea ſit paulò minor ſemiſſe dicto.

EXEMPLUM INQUIRENDI PROXIME MAjus, & proximè minus aliquid, menſurâ proportionis propoſitæ.

Nota ſit menſura proportionis inter 1000. 900. *quæ ſit* 10536.15. *quæritur menſura proportionis* 900. 800. *ut ſint æquales differentiæ inter* 1000. 900. *& inter* 900, 800.

Eſt igitur ut 9. *ad* 18. *ſic* 10536.05. *ad* 10706. 72. *Menſura verò proportionis* 9. 8. *eſt major. Rurſum ut medium proportionale inter* 8. 10. (*quod eſt* 89. 442719.) *ad* 10. *ſic* 10536. 05, *ad* 10779.66. *At menſura proportionis inter* 9. *&* 8, *eſt minor, ſcilicet* 11778.30.

NOTITIA COMMUNIS.

Omnis Numerus quantitatem exprimit effabilem.

XXV. PROPOSITIO.

Si numeri mille ſuccedant invicem, ordine naturali, bini differentes, unitate; ſuſcipiantur verò bini quicunque, deinceps ordinati, tanquam termini proportionis alicujus; erit hujus proportionis menſura, ad menſuram proportionis inter duos maximos Chiliadis, in proportione majore quidem, quàm quantum habet maximus ipſe 1000. ad majorem ex terminis ſuſceptis; minore verò quàm quantam habet idem 1000. ad minorem ex ſuſceptis. Minore etiam, quàm quantam habet 1000. ad medium proportionale inter ſuſceptos.

Suſcipiantur enim ex mille duo quicunq; deinceps, puta 501.

& 500. Et ſit Logarithmus prioris 69114. 92. *poſterioris* 69314. 72. *Horum* Logarithmorum *differentia eſt* 199.80. *Quare per definitionem proportionis inter* 501. & 500. *menſura eſt* 199. 80. *Eodem modo, quia maximi* 1000. Logarithmus *eſt* 0. *Proximi verò* 999. Logarithmus *eſt* 100.05, *& horum duorum* Logarithmorum *differentia itidem* 1000. 900. (*vel inter* 100000. 00. & 99900. 00.) *eſt* 100. 05. *copuletur jam maximus* 1000, *cum utroq; ſuſceptorum, ſic & cum* 501, *& cum* 500, *copuletur etiam menſura* 199. 80. *cum menſurâ* 100. 05, *dico proportione inter* 1000. & 50. *majorem eſſe proportionem inter* 199. 80. & 100. 05, *minorem verò eandem proportione inter* 1000. 500.

Demonſtratum eſt enim in prop. 23. *Menſuras duarum proportionum deinceps ordinatarum, comprehendere proportionem majorem minore earum, quæ ſint deinceps. Vt ſi ſint tres termini deinceps* 1000. 999. 998. *quorum priores quidem* 1000. 999. *faciant proportionem præcedentem, poſteriores* 999. 998. *ſequentem, præcedentis quidem proportionis menſura, ut prius erit* 100. 05. *ſequentis verò menſura erit* 100. 15. *Hæ duæ menſuræ* 100. 15. & 100. 05. *conſtituunt proportionem majorem, quàm termini* 1000. & 999.

Jam verò duæ menſuræ, altera quidem proportionis inter 1000. & 999. *hoc eſt*, 100. 05. *altera verò proportionis inter* 501. & 500. *hoc eſt*, 199. 80. *hæ, inquam, duæ menſuræ, ut termini conſideratæ proportionem inter ſe conſtituunt compoſitam ex proportionibus omnibus, omnium binarum, & binarum deinceps menſurarum, intercedentium per Axiom.* 1. *Similiter verò etiam termini ipſi* 1000. & 501. *proportionem inter ſe conſtituunt compoſitam ex totidem, hoc eſt, omnibus proportionibus omnium binorum, & binorum deinceps numerorum inter* 1000 & 501. *intercedentem per idem Ax.* 1.

Compoſitorum verò ex partibus æquè multiplicibus proportionalibus, eadem eſt proportio, quæ partium inter ſe ſingularum, hinc & inde combinatarum per 1. quinti Eucl. Ergò etiam hæ non deinceps ſitæ, ſed longè diſtantes menſuræ 100.05. & 199. 80. *proportionem facient majorem quàm termini non deinceps ſiti, ſed diſtantes longè ſcilicet* 1000. & 501. *Eodem tenore rurſum incipiendo ſyllogiſmum eundem inferemus duas menſuras deinceps* 100.15. & 100. 05. *conſtituere proportionem minorem quàm duos terminos deinceps* 999. & 998. *Menſurarum verò* 100.05. & 199. 80. *proportionem componi ex omnibus interjectis, & ſimiliter terminorum* 999. & 500. *proportionem componi ex totidem interjectis, quare etiam proportionem inter* 100. & 999.80. *minorem eſſe quàm inter* 999. & 500. *Multò igitur minorem quàm inter* 1000. & 500. *ut quæ ad proportionem* 999.500, *addit proportionem* 1000.999.

Tertio per eadem Syllogiſmi veſtigia euntes, ſic colligemus ex prop. 24. *præmiſſâ.*

Menſurarum deinceps ſitarum, ſcilicet 1000.15. & 1000. 05, *proportio eſt minor quàm ea, quæ eſt inter* 1000. & *medium proportionale Terminorum* 1000. 998. *vel quàm ea, quæ eſt inter hoc medium proportionale Terminorum* 1000. 998. & *terminum* 998. *Menſurarum vero non deinceps, ut* 100.05 & 199. 80. *proportio componitur ex interjectis omnium binarum, & binarum deinceps proportionalibus; & terminorum, quorum unus eſt medium proportionale inter* 1000. & 998. *id eſt,* √ 998,000. *alter* 500: *vel quod idem eſt unus* 1000. & *alter medium proportionale inter* 501. & 500. *ſeu* √ 250500; *hæc, inquam proportio componitur ex proportionibus, quas conſtituunt totidem interjectæ binorum, & binorum numerorum mediæ proportionales lineæ, accenſito termino* 1000. *Quare etiam men-*

ſuræ

ſuræ non deinceps ſitæ, ſcilicet 00.05. *&* 199.80. *proportionem exhibent minorem quàm* 1000, *cum medio proportionali inter ſuſceptos* 501. *&* 500.

COROLLARIUM I.

Propoſito numero quocunq; infra 1000, ejusque Logarithmo, quæcunque differentiæ Logarithmorum antecedunt propoſitum, verſus initium Chiliadis, ſunt ad ultimum Logarithmum (qui ſcilicet ad 999. apponitur) in proportione majore, quàm 1000. ad propoſitum; quæcunque ſequuntur verſus ultimum Logarithmum, ſunt ad eum in proportione minore.

COROLLARIUM II.

Hoc adjumento facilè implentur loca Chiliadis, quæ per ſuperiores propoſitiones nondum ſunt ſortita ſuos Logarithmos.

XXVI. PROPOSITIO.

Differentia binorum Logarithmorum, qui ſunt adſcripti ad numeros deinceps, eſt ad eorundem numerorum differentiam, in proportione majori quidem quàm eſt 1000. ad numerorum majorem; minore verò quàm idem 1000. eſt ad numerorum minorem.

Facilè demonſtratur per antecedentem ejusq; Corollarium. Nam ex unâ parte differentia duorum deinceps numerorum perpetuò eſt unitas (ſeu in prolongatis perpetuò 100.00.) *Jam verò ultimus Logarithmus eſt* 100.05, *idem, qui & menſura ultimæ & minimæ proportionis. Nulla igitur differentia numerorum deinceps differt à menſurâ ultimæ proportionis plus quàm quinque unitatibus numerorum prolongatorum. Ex alterâ verò parte Menſura proportionis duorum deinceps numerorum nihil eſt aliud, quàm differentia duorum ad illos numeros poſitorum Logarithmorum, per definitionem. Si igitur inter menſuram ſuſceptæ proportionis, & inter menſuram*

pro-

proportionis ultimæ eſt major proportio, quàm inter 1000. *&* *terminum ſuſceptæ majorē, erit etiam inter differentiam Logarithmorum deinceps, & inter differentiā numerorū, ad quos ſunt Logarithmi, proportio major quàm inter* 1000, *& terminum ſuſceptæ majorem. Nam quod Majori majus eſt, ipſius quoq; multo eſt majus. Sed proportio inter differentiam Logarithmorum, deinceps (verbi cauſa) inter* 199. 80. *&* 1000.00. *differentiam perpetuam numerorum deinceps, eſt major quàm proportio inter* 199. 80. *&* 100. 05; *Exceſſus enim eſt proportio inter* 100. 05. *&* 100.00. *Et inter* 199. 80. *&* 100.05. *proportio major fuit demonſtrata in præcedenti. Ergò multò eſt major proportio inter* 199.80. *&* 100.00. *quàm inter* 1000. *& (verbi cauſa)* 501. *terminum ſuſceptæ maiorem. Eſt verò eadem proportio inter* 199. 80. *differentiam Logarithmorum, &* 100.00. *differentiam numerorum, etiam minor quàm proportio inter* 1000. *&* 500. *terminum ſuſceptæ minorem, quod ſic probo.*

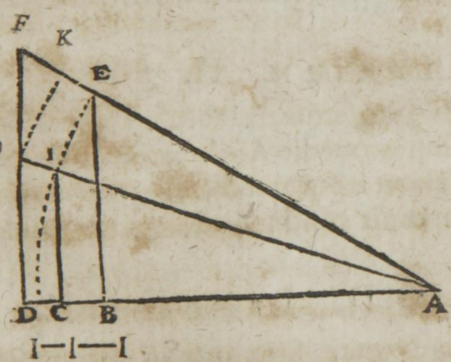
Proportio inter 199. 80. *&* 100. 05. *eſt minor quàm Proportio inter* 999. *&* 500. *Per demonſtrata* 25. *præcedente; ſimiliter verò etiam proportio inter* 100. 05 *&* 100. 00. *ſeu inter* 20. 01. *& inter* 20. 00. *eſt minor quàm proportio inter* 1000. *&* 999. *per Coroll. ad* 13. *quia ſcilicet eadem eſt differentia numerorum maiorum,* 2001. *&* 2000, *quæ minorum* 1000. *&* 999. *utrobiq; ſcilicet unitas.*

Componitur verò proportio inter 199. 80. *&* 100. 00. *ex utraq; ſuæ ſocietatis minore, ſcilicet ex Prop.* 199. 80. *ad* 100.05. *& ex Prop.* 100. 05. *ad* 100. 00. *Sic etiam proportio* 1000. *ad* 500. *componitur ex utrâq; ſuæ ſocietatis maiore, ſcilicet ex Prop.* 999. *ad* 500. *& ex Prop.* 1000. *ad* 999. *Ergò etiam ipſa compoſita prior erit minor, & compoſita poſterior erit maior.*

XXVII.

XXVII. PROPOSITIO.

Si numeri ſuccedant invicem ordine naturali, bini deinceps differentes unitate: ad ſingulos verò apponantur Logarithmi indices, ſeu menſuræ proportionum, quas conſtituunt abſoluti illi & rotundi numeri cum eorum maximo 1000, incrementa ſeu differentiæ horum Logarithmorum ſe habent ad Logarithmum elementi minimi proportionum, ſicut ſecantes ipſi toti arcuum, quorum complementis abſoluti bini numeri ut Sinus competunt, ſeſe habent ad numerum maximum, ſeu radium circuli: ſicut ex duobus ſecantibus duorum numerorum, inter quorum Logarithmos differentia proponitur, minor quidem minorem conſtituat proportionem cum radio, quàm differentia propoſita cum omnium primâ, major majorem, atq; etiam medium proportionale inter ſecantes majorem itidem.



In Schemate Prop. 21. *ſint æquales* D C, C B *differentiæ numerorum abſolutorum* C A, B A, *quorum maximus* D A. *Et quia* D C, C B *æquales: maior igitur eſt proportio* B A, A C *terminorum minorum, minor* C A, A D *maiorum per Corollar. ad* 13. *Maior igitur & menſura proportionis* B A, A C, *quàm proportionis* C A, A D, *hoc eſt differentia Logarithmorum ipſis* C A, *&* B A *abſolutis reſpondentium, eſt maior primo Logarithmo per* C D *repræſentato. Sit* δγ *Logarithmus ipſius* C A, *&* δβ *in eaſ-*

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dem lineæ partes, ſit Logarithmus ipſius B A, *& reſpondeat ipſi* C A, *ſecans* G A, *& ipſi* B A, *ſecans* F A. *Dico, proportionem* $\beta\gamma$, *ad* $\gamma\delta$, *majorem eſſe quàm proportionem* G A *ad* A D, *minorem verò quàm* F A *ad* A D, *minorem etiam quàm medium proportionale inter* F A *&* G A. *Nam per* 25. *præced. major eſt proportio* D A *ad* A B, *quàm* $\beta\gamma$ *ad* $\gamma\delta$, *major etiam* D A *ad medium inter* B A, D A: *ſed* F A *ad* A D *proportio æqualis eſt proportioni* D A *ad* A B, *quia* D A *eſt medium proportionale inter* B A, A F: *ſic etiam medii Geometrici inter* F A, G A *ad* D A *proportio æqualis eſt proportioni* D A, *ad medium Geometricum inter* D A, A B. *Major igitur etiam* F A *ad* A D, *major etiam medii proportionalis inter* F A, A G *ad* A D *quàm* $\beta\gamma$ *ad* $\gamma\delta$. *Sic per eandem minor eſt* D A *ad* A C, *& ſic etiam* G A *ad* A D *quàm* $\beta\gamma$ *ad* $\gamma\delta$.

COROLLARIUM I.

Idem obtinet etiam tunc, ſi duo termini differunt, non ſolâ unitate elementi minimi, ſed aliâ unitate, quæ ſit illius decupla, centupla, millecupla.

COROLLARIUM II.

Hinc differentiæ ſatis juſtæ, præſertim ubi abſoluti numeri ſatis magni ſunt, extrui poſſunt, ſumpto medio Arithmetico inter duos ſecantes parvos, vel etiam (ſi placet labor) medio Geometrico inter ſecantes majores, exque differentiis continuè additis, accumulari Logarithmi.

COROLLARIUM III. PRÆCEPTUM.

Divide ſinum totum per utrumq; proportionis ſuſceptæ terminum, quotientis utriuſque medium Arithmeticum eſt quæſitum incrementum, hoc adde ad Logarithmum termini majoris, prodit Logarithmus termini minoris.

EXEMPLUM.

Datus eſto Logarithmus ad 700. *ſcilicet* 35667. 4948.

quæ-

quæritur Logarithmus ad 699. *Divide ergò Radium per* 700, *prodit* 142857. 142857. 142857. 142857. *&c. divide etiam per* 699, *prodit* 1430672. *&c.*

Propius & omninò proximum vero eſt Mediũ Geometricum, at non eſt precium operæ tam operoſæ, quando unus ſolus vel alter Logarithmus eſt conſtituendus.

Medium Arithmeticum eſt 142.962.

Adde hoc ad---------35667.4948.

Prodit Logarithmus ad 699.-----35810. 4568.

COROLLARIUM IV. PRÆCEPTUM de Logarithmis ſinuum.

Incrementum Logarithmorum inter duos ſinus ſic inquires: inter ſecantes complementorum conſtituatur medium Geometricum, dividaturq; per differentiam ſinuum, prodit differentia Logarithmorum.

EXEMPLUM.

Sit Sin. Gr. 0. 1. 29. 09. *Sec. compl.* 343774682.
0. 2. 58. 18. *Sec. compl.* 171887348.

Diff. 29. 09. *Medium Geom.* 2428. *circiter*
2909.

Quotiens 80000. *eſt major quæſito incremento Logarithmorum, quia ſecantes admodum magni ſunt.*

APPENDIX.

Eodem ferè modo poſſet etiam demonſtrari, differentias ſecundas eſſe in duplâ proportione primarum, tertias in duplâ ſecundarum. Verbi causâ, cum in ipſo principio Logarithmorum differentia prima ſit 100. 00000. æqualis ſcilicet ipſi differentiæ numerorum 100000. 00000. & 99900. 00000. Secunda ſeu differentiarum differentia 10000. Tertia 100. Poſtquam ad numerum 50000. 00000. ventum fuerit, Logarithmi qui-

dem proximi differentiam faciunt 200.00000. quæ ſic habet ad differentiam primam, ſicut numerus 50000. 00000. ad maximum 100000.00000. Secunda verò differentia eſt 40000, in qua 10000. continetur 4ter, Tertia 328. in qua 20. continetur 16ies. At cùm in re inſolitâ laboremus penuriâ vocabulorum: quare ne nimium obſcura proponamus, demonſtratio dimittatur intentata.

XXVIII. PROPOSITIO.

Nullus numerus exactè exprimit menſuram proportionis inter binos unius Millenarii numeros, methodo ſuperiori conſtitutam.

Nam quia termini uniuſcujuſq; proportionis extremi non ſunt ab invicem, ut duo numeri ejuſdem ſpeciei figurativæ, tam multorum graduum, quot vices arbitrariæ ſunt aſſumptæ ad ſecundam proportionem in minima elementa arbitraria: mediæ ergò proportionales elementa conſtituentes ſunt ineffabiles per 9. Prop. Differentia igitur inter mediarum proportionalium maximam, & terminum per 1000. *ſignificatum eſt & ipſa ineffabilis. Sed menſura proportionis inter* 1000. *& terminum minorem effabilem in Chiliade eſt multiplex hujus differentiolæ, id eſt, & commenſurabilis eſt illi. Ergò menſura hæc eſt terminis incommenſurabilis, hoc eſt, ineffabilis. At nullus ergò numerus, & ſic neq; Logarithmus, exactè exprimit hanc menſuram.*

ADMONITIO.

Intereſt igitur obſervare, quouſq; ſeſe proferat hoc vitium. Nam ſi proportio 999.1000, ſecatur in particulas 16777216. per 24tas proportionales medias, & in particulæ unius menſurâ numero expreſsâ peccetur ſemiſſe unitatis: multiplicatus hic error cum ipsâ menſurâ Elementi in numerum Elementorum proportionis, efficiet 8000000. unitates.

19. Pro-

XXIX. PROPOSITIO.

Si menſuræ proportionum omnium exprimantur numeris ſeu Logarithmis: non omnes proportiones ſortientur legitimam ſuam menſuræ portionem ad omnem minutiarum ſcrupuloſitatem.

Nam per 11. *prop. Proportiones numerorum Chiliadis, inter ſe ſunt incommenſurabiles, omnes verò eorum Logarithmi ſunt effabiles per Ax.* 3. *& ſic indicant menſuras inter ſe commenſurabiles: injuſtâ igitur partitione, ſi ad minima veniatur.*

NOTA.

Locum idem habet etiam in ſinubus, inq́; proportione circuli ad circumferentiam, & paſſim; & intereſt animadvertere, à quâ figurâ numeri, vitium incipiat, ne in numeris eâ poſterioribus fruſtrà impendamus operam.

XXX. PROPOSITIO.

Si ad Numerum 1000. Chiliadis maximũ referantur aliqui majores, ipſi verò 1000, ſit applicatus Logarithmus 0, Logarithmi majoribus competẽtes erũt privativi.

Referatur ad 1000. *major* 1024. *fiatq́; ut* 1024. *ad* 1000. *ſic hic ad* 97656. 25, *ſit etiam menſura proportionis inter* 100000. 00. *&* 97656. 25, *Logarithmus* 2371. 6526. *Cùm ergò proportio inter* 1024. *&* 1000. *ſit æqualis proportioni inter* 100000. 00. *&* 97656. 25. *Erit eadem menſura ejus. Et ſi ad* 1024. *apponeretur* Logarithmus 0. *tunc ad* 1000. *apponendus eſſet* Logarithmus 2371. 6526. *ad numerum verò* 97656. 25. *duplum hujus Logarithmi, quia proportio* 10240000. *ad* 97656. 25. *eſt dupla proportionis* 1024. *ad* 1000. *ſed quia ad* 1000. *in Chiliade apponitur* Log. 0. *deterſo* Logarithmo, *&* 2371. 6526, *& à duplo hujus etiã apud* 97656. 25. *ſimplum eſt deterſum in Canone Chiliadis, ergò etiam à* Logarithmo *ipſius* 1024, *cui applicaveramus* Logarithmum 0, *detergendum eſt tantundem. Si verò à* 0 *auferas* 2371. 6526. *relinquitur* 2371. 6526. *privativum cum ſigno Coſſico.*

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METHODUS COMPENDIOſiſſima conſtruendi CHILIADA Logarithmorum.

PRINCIPIO *inquiratur Logarithmus, qui metitur proportionem inter* 100000. 00. *&* 97656. 25. *quæſitâ mediâ proportionali, maximâ viceſimarum quartarum inter hos terminos, ejusq́; & numeri totalis prolongati differentiâ toties duplicatâ: emerget autem* Logarithmus 2371.6526. *qui idem eſt etiam numeri* 1024. *defectivus per* 30. *Secundò idem fiat etiam cum proportione inter* 1000. *&* 500: *emerget autem Logarithmus ad* 500, *iſte* 69314. 7193, *qui idem etiam duplicationis Logarithmus dicitur.*

Iam quia ut 1000. *ad* 500. *ſic* 1024. *ad* 512. *& hic ad* 256, *& hic ad* 128. *& hic ad* 64. *& hic ad* 32, *& hic ad* 16, *& hic ad* 8, *& hic ad* 4, *& hic ad* 2, *& hic ad* 1.

Decupla eſt igitur proportio 1024 *ad* 1, *proportionis* 1000 *ad* 500. *Quare Logarithmus ad* 1, *tunc quidem erit decuplus Logarithmi ad* 500, *cum numerus* 1024. *acceperit* Logarithmum 0. *ſed ubi ei privativus* 2371.6526, *fuerit applicatus, etiam ipſius* 1. Logarithmus *erit diminuendus tanto. Diminuatur decuplum dupli-*

duplicantis 693147.1928.

2371.6526.

Hic eſt Logarithmus unitatis in Chiliade noſtrâ ſeu 100.00. 690775.5422.

Et igitur 10.00. 921034.0563.

Et quia ut 1.*ad* 10,*ſic hic ad* 100. *& hic ad* 1000,*tripla eſt itaq; proportio* 1000. *ad* 1.*proportionis* 1000.*ad* 100. *Tertia igitur pars* Logarithmi *ad* 1.*eſt apponenda pro* Logarithmo *ad* 100. *puta* 230258.5141. *& hic etiam eſt* Logarithmus *decuplicationis, duæ verò tertiæ ſunt* Logarithmus *ad* 10,*ſcilicet* 460517.0282. *Quod ſi duplicantem abſtuleris à* Logarithmo *ad* 1. *emergit* Logarithmus *ad* 2, *ſi ab hoc abſtuleris* Logarithmum *ad* 10. *reſtat* Logarithmus *Quinduplicationis*

Logar.*ad* 1.	690775. 5422.
Duplicans	69314. 7193.
Logar. *ad* 2.	621460. 8229.
Logar.*ad* 10.	460517. 0281.
Quinduplicans	160943. 7948.

Hiſce ſic præparatis jam conſtruantur Logarithmi *centum maximorum, initio facto à* 999, *hâc methodo. Totalis* 1000.*prolongatus* 7. *cyphris dividatur per ſingulos ordine; quotientes referantur in Tabellam, ſunt enim ſecantes illorum arcuum, quorum complementa habent diviſores iſtos pro ſinubus, ut ſi diviſor ſeu ſinus complemēti* 999,*quotiens ſeu ſecans erit* 100.10010. *ſin dividat* 901,*quotiens erit* 110.98779; *ſin* 900. *quotiens erit* 111.11111. *Diviſio autem continuatur propterea uſq; ad octavam figuram, ut conſtat nobis quantum differat medium Arithmeticum à Geometrico, ubi maximè. Vt ſi multiplicatis in ſe duobus ultimis quotientibus, radix quæratur, ea erit,* 111.04942. *At medium Arithmeticum inter duos quotientes eſt* 111.04945.

Inſtru-

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In ſtructurâ igitur centum minimorum Logarithmorum *media hæc duo inter ſe ſunt æqualia, uſq; ad ſeptimam figuram incluſivè: in octavâ oritur differentia ternarii. Pone in omnibus centum mediis eſſe tantam. Si ergò centum media Arithmetica ordine accumules, peccarent illa exceſſu nõ majore quàm* 00300. *ternarii ſcilicet in tertiâ figurâ poſt punctum. At verò non eſt in omnibus centum tanta differentia: in initialibus enim penitus evaneſcit, ut inter* 100.00000. & 100.10010. *Hic enim utrumque medium eſt* 100. 05005. *& differentia occultatur in figuris ulterioribus, ſi quis illas erueret. Quare centum minimos* Logarithmos *tutiſſimè conſtituimus per acumulationem mediarum proportionalium inter quotientes per* 27. *Prop. Semper enim additis duobus ſecantibus ad* Logarithmi *prioris duplum conflatur duplum* Logarithmi *poſterioris.*

Conſtructis his Logarithmis; *eligatur* Logar. *ad* 960. *qui erit* 4082. 2001. *ferè. Huic ſi continuè adjeceris duplicantem, emergent* Logarithmi *ad* 480.240.120.60.30.15. *Quia proportio* 960. *ad* 15. *eſt ſextupla proportionis* 1000. *ad* 500. *Ita emerget* Logarithmus *ad* 15. *qui eſt* 419970.5159. *& ad* 30. Log. 350655. 7965. *Hunc ſi abſtuleris à* Logar. *ad* 10. *ſcilicet*

460517.0281.

Reſtabit 109861. 2316. *Triplicans Logarithmus.*

Hunc ergò aufer à Logar. *ad* 1. 690775.5422.

Reſtat Logar. *ad* 3. 580914.3106.

Idem etiam ex Log. *ad* 900. *elici poteſt, probationis cauſa. Nam hujus* Logar. *eſt* 10536.0535. *Etſi jam hic eſt nimius ob cauſam dictam. Nam ut* 1000. *ad* 900. *ſic* 9000. *ad* 8100. *& ut* 1000. *ad* 8100. *ſic hic ad* 6561. *Quadruplum ergò* Logarithmi *ad*

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ad 900.*reſpondet numero* 6561.(*ſeu* 90000.00.*numero* 65610.00.) *ſcilicet* 42144.2140. *Atqui numerus* 65610.00.*eſt ternarii de* 1000.*continuè multiplex. Ecce* 6561. 2187. 729. 243. 81. 27.9.3.1.*Ergò proportio* 6561.*ad* 1.*eſt octupla proportionis* 3.*ad* 1.

Ergò Logarithmo *ad* 1000. *ſcilicet*, 921034.0563.
Aufer Log. *ad* 65610.00. *ſcilicet* 42144.2140.

Reſidui 878889.8423.
Pars octava 109861.2303. *Et paulò minor quàm prius.*

Scilicet, quia Logarithmus *ad* 900. *& ſic etiam ejus quadruplum juſto majus fuit, id verò ſubtractum à juſto* Logar. *ad* 1. *relinquit juſto minus. Et ſanè etiam biſectio continua proportionis inter* 10. *&* 9.*oſtendit ultimas hujus* Logar. *ad* 900. *figuras, non* 0535. *ſed* 0513. *per* 22. *minus, cujus quadruplum eſt* 88. *peccatum reſidui, & hujus pars octava* 11.*ad* 2303.*addita facit* 2314. *planè ut in priori proceſſu invenimus* 2316.

Idem etiam ex priori Logar. *ad* 960. *aliâ viâ, quia* 1000. *ad* 960. *eſt ut* 9600. *ad* 9216. *& cum* Logarithmus 960. *ſit* 4082.2001. *erit* Logar. *ad* 9216. *duplus prioris ſcilicet* 8164.4002. *At verò proportio* 9216. *ad* 9. *eſt decupla proportionis* 1000.*ad* 500.*Ecce:* 9216.4608.2304.1152.576.288.144.72.36.18.9.*& proportio* 9.*ad* 1.*eſt dupla proportionis* 3.*ad* 1.*Ergò ad decuplum duplationis* 693147.1928. *adde* Logar. *ad numerum* 92160.00.*ſcilicet* 8164.4002.

701311. 5930.*aufer à* Logar.
ad 10.00.*ſummam quæ eſt* Logar. *ad* 90.00. *ſcilicet* 921034 0563.

Reſtat	219722.4633.
Hujus dimid.	109861.2316. *eſt Triplicans ut prius.*

Sic ex Log. ad 990. (*vel* 99000. 00.) *qui eſt* 1005. 0331. *vel ſine decuplicante, vel per eum perveniemus ad Logarithmum ad* 11. (*vel* 100. 00.) *Nam ad* 98010. 00. *erit Logarithmus duplus, ſcilicet* 2010. 0675. *Hic additur ad quadruplum triplicantis,* 439444. 9256.

facit 441454. 9931. *Log. ad* 1210. 00.

Hoc aufer à Log. *ad* 10. 00. -----------	921034. 0563.
Reſtat	439579. 4632.
Hujus dimid. -----------	239789. 5316. *Undecuplat. aufer*
à Logar. ad 1.	690775. 5422.
Reſtat	450986. 0100. Log. ad 1100. 00.

Sic quia ut 1000. *ad* 980. *ſic hic eſt ad* 9604. *Duplus igitur Logarithmi ad* 980 *eſt* Logarithmus *ad* 9604. *ſcil.* 4040. 5422. *Et verò proportio* 9604. *ad* 2401. *eſt dupla proportionis* 1000. *ad* 500. *& proportio* 24010. 00. *ad* 10. 00. *eſt quadrupla proportionis* 70. 00. *ad* 10. 00. *Adde igitur duplum duplicantis ſcilicet*

	138629. 4386.
ad	4040. 5422.
Summam	142669. 9808. Log. ad 2401.
Aufer à Log. 10. 10000.	921034. 0563.
Reſidui	778364. 0775.
Pars quarta	194591. 0194. *Septupl.*
Hoc igitur aufer à Log. ad 100.	230258. 5141.
Reſtat Logar. ad 700. *vel* 70000. 00.	35667. 4947.

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Atq; hic idem ad 700. *per continuam biſectionem proportionis* 10. 7. *per maximam triceſimarum proportionalium exactiſſimi tantus prodiit. Vide hanc ſuprà in Tabellâ. Sic quia ut* 1000. *ad* 950. *ſic* 9500. *eſt ad* 9025. *Ergò* Logarithmus *ad* 9025. *eſt illius duplus ſcilicet* 10258.6606.

Adde duplū quinduplicātis ſc.	321887.5896.
Conſurgit	332146.2402. Log. *ad* 3610.00.
Hunc aufer à Log. ad 10.00.	921034.0563.
Reſidui	588887.8061.
Dimidium	294443.9030. *Novemdecuplat.*
Aufer id à Logar. ad 1. *vel ad* 100.00.	690775.5422.
Reſtat	396331.6392. *Log. ad* 1900.00.

Eundem derivabimus etiam ex 912. *cujus* Logar. 9211. 5306. *& quia proportio* 912. *ad* 57. *eſt quadrupla proportionis* 1000. *ad* 500. *Duplicantis adde quadruplum, ſcilicet* 277258. 8771. *Conſurgit* 286470.4077. *Huic adde Triplicantem*

	109861.2316.
Reſtat	396331.6393. *Log. ad* 1900.00.

Eundem ex 950. *derivabimus aliâ viâ:*

Logar. *ad* 95000.00.	5129.3303.
Decuplans	230258.5141.
Logar. *ad* 9500.00.	235387.8444.
Quinduplicans	160943.7948.
Logar. *ad* 1900.00.	396331.6392.

Sic ad Logar.ad 988.------ 1207. 2583.
Adde duplicantis duplum 138629. 4386.

Venit Logar.ad 247.------139836.6969.
Novemdecuplicans addatur 294443.9030.

Prodit Logar. *ad* 13. 434280.5999.
Auferatur Logarith. *ad* 1. 690775.5422.

Reſtat 256494.9423. *Tridecuplans.*

Sic ad Logar.ad 969. 3149. 0672.
Adde triplicantem 109861. 2316.

Venit Log.ad 323.---------113010.2988.
Adde Novemdecuplum 294443. 9030.

Venit Log. *ad* 17.---------407454.2018. *Aufer hunc à* Lo-
garith.ad 1. 690775. 5422.

Reſtat Septemdecuplans 283321.3404.

Sic ad Logar.986 1409.8927.
Adde duplicantem------ 69314.7193.
Et Septemdecuplum----- 283321.3404.

Venit Logar.*ad* 29.------354045.9524.*Auferatur*
à Logar.o. 690775.5422.

Reſtat 336729.5898. *Vndetriginduplās.*

Et

Et ad Log. *ad* 966.------- 3459.1450.
Adde duplicantem----- 69314.7193.
Et Triplicantem 109861.2316.
Et Septuplicantem 194591.0194.

Venit Log. *ad* 23. 377226.1153. *qui ablatus*
à Logar. *ad* 10.00. 690775.5422.

Relinquit 313549.4269. *Viginticuplans.*
Eundem ex Log. 920. *Quia ut* 1000. *ad* 920. *ſic* 9200. *ad* 8464. *Ergò* Logar. *ad* 920. *duplum*---- 16676.3247.
Adde ad quadruplum duplicantis 277258.8771.
Conſurgit---------------------- 293935.2018. *Aufer*
à Logar. 1. *de* 10000------------- 921034.0563.
Reſtat 627098.8545.
Dimidium 313549.4272.

Eundem ex Logar. *ad* 920. *jam abundanti ſic extruo:*
Ad Logar. *ad* 920.-------- 8338.1624.
Adde duplicantis duplum 138629.4386.
Et decuplicantem 230258.5141.

Venit Logar. *ad* 23. 377226.1151.

Sic ad Logar. *ad* 930.---- 7257.0706. *majuſculum.*
Adde triplicantem 109861.2316.
Et decuplicantem 230258.5141.

Venit Logar. ad 31. 347376.8163. *majuſculus autem*
8149. *verior.*
à Logar. *ad* 1. 690775.5422.

343398.7259. *undetrigintuplicans minuſculus.*

Eundem ex Log.*ad* 961.*elicio ſic. Nam quia ut* 961. *ad* 31. *ſic hoc ad* 1. *Ergò.*

Aufer Logarithmum ad 961.	3978.0876.
à Logar.ad 1.--------	69077.5422.
Reſtat	686797.4546.
Hujus dimid.	343398. 7273.*Vndetrigintupla* *Hic eſt juſtior.*

Jam *quia intra millenarium quadratus major non eſt quàm* 961.*non igitur opus nobis erit multiplicationibus aliis, ſecundum primos majores ipſo* 31. *Nam omnis primi majoris multiplex infra* 1000.*ſecundum aliquem numerum minorem, quàm* 31.*eſt multiplex: ut* 979.*eſt undecuplus primi* 89.

Vbi notandum, quod Logarithmus *alicujus proportionis multiplicis ſit differentia inter Logarithmum unitatis in Chiliade, & inter* Logarithmum *numeri, qui multiplicitate proportionis prodit. Is igitur* Logarithmus *Multiplicator additus* Logarithmo *cujuſque numeri, conſtituit* Logarithmum *partis, abſtractus* Logarithmum *multiplicis. Idem verum eſt de* Logarithmis *proportionum non multiplicium, qui ſunt nihil aliud quàm differentiæ, vel Multiplicantium* Logarithmorum, *vel appoſitorum ad numeros multiplicium denominatores: ut eadem eſt differentia inter ſeptuplicantem & triplicantem, quæ eſt inter* Logar. *ad* 7. *&* Logar. *ad* 3. *Hûc igitur additâ* Logarithmo *numeri tertii conſtituit* Logarithmum *Numeri proportionalis tertio minoris, ablata conſtituit* Logar.*Numeri proportionalis, tertio majoris.*

Hoc modo plerorumq; Primorum infra 500 Logarithmi *eruuntur ex uno centum poſitorum: nam in primo centenario nullus ſupereſt, in ſecundo ſoli quinque* 271.149.167.173.179. *in tertio undecim*, 211. 223. 251. 257. 263. 269. 271. 277. 281. 283.

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283. 293. *in quarto undecim.* 337. 347. 349. 353. 359. 367. 373. 379. 383. 389. 397. *in quinto novem.* 401. 409. 419. 421. 431. 433. 439. 443. 449. *Summa* 36.

Reſtant ii qui ſunt inter 500. *&* 900. *primi* 59. *numero, prætereaq; etiam multiplices jam expreſſorum triginta ſex totidem ſcilicet dupli; ex iis minorum ſedecim tripli, primorum ſeptem quadrupli, & ex his priorum quinque quintupli, duorum* 127. *&* 149. *ſextupli, unius* 127. *ſeptuplus.*

Vt igitur etiam ad hos, & ad primos ſupra 500. *numero* 59. Logarithmi *habeantur, conſiderandæ ſunt differentiæ* Logarithmorum *poſitorum ad interſperſos hiſce: & quâ methodo differentiæ prius ſunt conſtitutæ* Logarithmorum 100. *minorum ſerie continua, eadem nunc etiam per prop.* 27. *Coroll.* 3. *& maximè per ejus appendicem, ſi quis ea dextrè utatur, interrupta ſerie, & quidem longè facilius hæ differentiæ ſunt ſupplendæ, quia plerunque vel unus ſolus, vel bini deinceps, rarò tres deinceps* Logarithmis *ſuis carebunt, ita ut in accumulatione differentiarum crebrò reverſio fiat, ad Logarithmum jam antea certum.*

CHI-

CHILIAS
Logarithmorum
JOH. KEPLERI, MATHEM.
CAESAREI.

ARCUS

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſima quarta.	Logarithmi cum differentiis.	Partes ſexagenaria.
	1		1611809. 59	
			69314. 72	
	2		1542494. 87	
			40546. 51	
	3		1501948. 36	
			28768. 21	
	4		1473180. 15	
			22314. 35	
	5		1450865. 80	
			18232. 16	
	6		1432633. 64	
			15415. 07	
	7		1417218. 57	
			13353. 14	
	8		1403865. 43	
			11778. 30	
	9		1398087. 13	
			10536. 05	
	10		1381551. 08	
			69314. 72	
	20		1312236. 36	
			40546. 51	
	30		1271689. 85	
			28768. 21	
	40		1242921. 64	
			22314. 35	
	50		1220607. 29	
			18232. 16	
	60		1202375. 13	
			15415. 07	
	70		1186960. 06	
			13353. 14	
	80		1173606. 92	
			11778. 30	
	90		1161828. 62	
			10536. 05	
	1. 00		1151292. 57	
			69314. 72	
	2. 00		1081977. 85	
			40546. 51	

Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
	3.00		1041431.34	
			28768.21	
	4.00		1012663.13	
			22314.35	
	5.00		990348.78	
			18232.16	
	6.00		972116.62	
			15415.08	
	7.00		956701.54	
			13353.14	
	8.00		943348.40	
			11778.30	
	9.00		931570.10	
			10536.05	
	10.00		921034.05	
			69314.72	
	20.00		851719.33	
			40546.51	
	30.00		811172.82	
			28768.21	
	40.00		782404.61	
			22314.35	
	50.00		760090.26	
			18232.16	
	60,00		741858.10	
			15415.07	
	70.00		726443.03	
			13353.14	
	80.00		713089.89	
			11778.30	
	90.00		701311.59	
3.26			10536.05	
0. 3. 26	100,00	0.1.26	690775.54	0.4
3.27			69314.72	
0. 6. 53	200.00	0.2.53	621460.82 +	0.7
3.26			40546.51	
0.10.19	300.00	0.4.19	580914.31	0.11
3.26			28768.21	
0, 13. 45	400.00	0.5.46	552146.10 +	0.14
3.27			22314.35	

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
3.27			22314.35	
0.17.12	500.00	0.7.12	529831.75—	0.18
3.26			18232.16	
0.20.38	600.00	0 8.38	511599.59	0.22
3.26			15415.07	
0.24.4	700.00	0.10.5	496184.52+	0.25
3.26			13353.14	
0.27.30	800.00	0.11.31	482831.38+	0.29
3.26			11778.30	
0.30.56	900.00	0.12.58	471053.08	0.32
3.27			10536.05	
0.34.23	1000.00	0.14.24	460517.03	0.36
3.26			9531.02	
0.37.49	1100.00	0.15.50	450986.01	0.40
3.26			8701.14	
0.41.15	1200.00	0.17.17	442284.87	0.43
3.27			8004.27	
0.44.42	1300.00	0.18.43	434280.60	0.47
3.26			7410.80	
0.48.8	1400.00	0.20.10	426869.80+	0.50
3.26			6899.27	
0.51.34	1500.00	0.21.36	419970.53—	0.54
3.26			6453.86	
0.55.0	1600.00	0.23.2	413516.67—	0.58
3.27			6062.47	
0.58.27	1700.00	0.24.29	407454.20	1.1
3.26			5715.84	
1.1.53	1800.00	0.25.55	401738.36	1.5
3.27			5406.72	
1.5.20	1900.00	0.27.22	396331.64	1.8
3.26			5129.33	
1.8.46	2000.00	0.28.48	391202.31	1.12
3.26			4879.02	
0.12.12	2100.00	0.30.14	386323.29	1.16
3.26			4652.00	
1.15.38	2200.00	0.31.41	381679.29	1.19
3.27			4445.17	
1.19.5	2300.00	0.33.7	377226.12—	1.23
3.26			4255.97	
1.22.31.	2400.00	0.34.34	372970.15+	1.26
3.26			4082.20	

Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſima quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
3. 26			4082. 20	
1. 25. 57	2500. 00	0. 36. 0	368887. 95+	1. 30
3. 27			3922. 07	
1. 29. 24	2600.00	0. 38. 53	364965. 88	1. 34
3. 26			3774. 03	
1. 32. 50	2700.00	0. 38. 53	361191. 85−	1. 37
3. 26			3636. 77	
1. 36. 16	2800.00	0. 40. 19	357555. 08+	1. 41
3. 27			3509. 13	
1. 39. 43	2900. 00	0. 41. 46	354045. 95	1. 44
3. 26			3390. 15	
1. 43. 9	3000. 00	0. 43. 12	350655. 80−	1. 48
2. 26			3278. 99	
1. 46. 35	3100. 00	0. 44. 38	347376. 81+	1. 52
3. 27			3174. 86	
1. 50. 2	3200. 00	0. 46. 5	344201. 95−	1. 55
3. 26			3077. 17	
1. 53. 28	3300. 00	0. 47. 31	341124. 78	1. 59
3. 27			2985. 29	
1. 56. 55	3400.00	0. 48. 58	338139. 49+	2. 2
3. 26			2898. 76	
2. 0. 21	3500. 00	0. 50. 24	335240. 73	2. 6
3. 26			2817. 08	
2. 3. 47	3600. 00	0. 51. 50	332423. 65−	2. 10
3. 26			2739. 90	
2. 7. 13	3700.00	0. 53. 17	329683. 75−	2. 13
3. 27			2666. 83	
2. 10. 40	3800. 00	0. 54. 43	327016. 92	2. 17
3. 27			2597. 55	
2. 14. 7	3900.00	0. 56. 10	324419. 37+	2. 20
3. 26			2531. 78	
2. 17. 33	4000.00	0. 57. 36	321887. 59	2. 24
3. 26			2469. 26	
2. 20. 59	4100.00	0. 59. 2	319418. 33	2. 28
3. 27			2409. 75	
2. 24. 26	4200.00	1. 0. 29	317008. 58−	2. 31
3. 26			2353. 05	
2. 27. 52	4300.00	1. 1. 55	314655. 53−	2. 35
3. 27			2298. 95	
2. 31. 19	4400.00	1. 3. 22	312356. 58−	2. 38
3. 26			2247. 29	

Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſima quarta.	Logarithmi cum differentiis.	Partes ſexagenaria.
3. 26			2247. 29	
2. 34. 45	4500. 00	1. 4. 48	310109. 29—	2. 42
3. 27			2197. 89	
2. 38. 12	4600.00	1. 6. 14	307911. 40—	2. 46
3. 26			2150. 62	
2. 41. 38	4700.00	1. 7. 41	305760. 78—	2. 29
3. 26			2105. 34	
2. 45. 4	4800.00	1. 9. 7	303655. 44—	2. 53
3. 27			2061. 93	
2. 48. 31	4900.00	1. 10. 34	301593. 51—	2. 56
3 27			2020. 27	
2. 51. 58	5000.00	1. 12. 0	299573. 24—	3. 0
3. 27			1980. 27	
2. 55. 25	5100 00	1. 13 26	297592. 97+	3. 4
3. 26			1941. 81	
2. 58. 51	5200. 00	1. 14. 53	295651. 16+	3. 7
3. 27			1904. 81	
3. 2. 18	5300. 00	1. 16. 19	293746. 35—	3. 11
3. 27			1869. 22	
3. 5. 45	5400.00	1. 17. 46	291877. 13+	3. 14
3. 26			1834. 91	
3. 9. 11	5500. 00	1. 19. 12	290042. 22—	3. 18
3. 27			1801. 85	
3. 12. 38	5600.00	1, 20. 38	288240. 37	3. 22
3. 26			1769. 96	
3. 16. 4	5700.00	1. 22. 5	286470. 41	3. 25
3. 27			1739. 17	
3. 19. 31	5800. 00	1. 23. 31	284731. 24—	3. 29
3. 27			1709. 45	
3. 22. 58	5900 00	1. 24. 58	283021. 79	3. 32
3. 26			1680. 71	
3. 26. 24	6000, 00	1. 26. 24	281341. 08	3. 36
3. 27			1652. 93	
3. 29. 51	6100. 00	1. 27. 50	279688. 15	3. 40
3. 26			1626. 05	
3. 33. 17	6200.00	1. 20. 17	278062. 10—	3. 43
3. 27			1600. 04	
3. 36. 44	6300.00	1. 39. 43	276462, 06+	3. 47
3. 27			1574. 83	
3. 40. 11	6400.00	1. 32. 10	274887. 23	3. 50
3. 26			1550. 42	

Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſima quarta.	Logarithmi cum differentiis.	Partes ſexagenaria.
3.26			1550.42	
3.43.37	6500.00	1.33.36	273336.81—	3.54
3.27			1526.75	
3.47.4	6600.00	1.35.2	271810.06	3.58
3.26			1503.79	
3.50.30	6700.00	1.36.29	270306.27 +	4.1
3.27			1481.50	
3.53.57	6800.00	1.37.55	268824.77—	4.5
3.27			1459.88	
3.57.24	6900.00	1.39.22	267364.89	4.8
3.26			1438.88	
4 0.50	7000.00	1.40.48	265926.01	4.12
3.27			1418.46	
4.4.17	7100 00	1.42 14	264507.55	4.16
3.27			1398.62	
4.7.44	7200.00	1.43.41	263108.93—	4.19
3.26			1379.33	
4.11 10	7300.00	1.45.7	261729.60—	4.23
3.27			1360.57	
4.14.37	7400.00	1.46.34	260369.03—	4.26
3.27			1342.31	
4.18.4	7500.00	1.48.0	259026.72 +	4.30
3.27			1324.52	
4.21.31	7600.00	1.49.26	257702.20	4.34
3.26			1307.21	
4.24.57	7700.00	1.50.53	256394.99 +	4.37
3.27			1290.34	
4.28.24	7800.00	1.52.19	255104.65 +	4.41
3.27			1273.90	
4.31.51	7900 00	1.53.46	253830.75	4.44
3.27			1257.88	
4.35.18	8000.00	1.55.12	252572.87	4.48
3.27			1242.25	
4.38.45	8100.00	1.56.38	251330.62	4.52
3.27			1227.01	
4.42.12	8200.00	1.58.5	250103.61	4.55
3.26			1212.14	
4.45.38	8300.00	1.59.31	248891.47 +	4.59
3.27			1197.61	
4.49.5	8400.00	2.0.58	247693.86—	5.2
3.27			1183.45	

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
3.27			1183.45	
4.52.32	8500.00	2.2.24	246510.41	5.6
3.27			1169.60	
4.55.59	8600.00	2.3.50	245340.81—	5.10
3.27			1156.09	
4.59.26	8700.00	2.5.17	244184.72 +	5.13
3.27			1142.86	
5.2.53	8800.00	2.6.43	243041.86—	5.17
3.27			1129.96	
5.6.20	8900.00	2.8.10	241911.90	5.20
3.28			1117.33	
5.9.48	9000.00	2.9.36	240794.57—	5.24
2.27			1104.99	
5.13.15	9100.00	2.11.2	239689.58 +	5.28
3.27			1092.90	
5.16.42	9200.00	2.12.29	238596.68	5.31
3.27			1081.09	
5.20.9	9300.00	2.13.55	237515.59	5.35
3.27			1069.53	
5.23.36	9400.00	2.15.22	236446.06—	5.38
3.27			1058.21	
5.27.3	9500.00	2.16.48	235387.85—	5.42
3.28			1047.13	
5.30.31	9600.00	2.18.14	234340.72—	5.46
3.27			1036.28	
5.33.58	9700.00	2.19.41	233304.44—	5.49
3.27			1025.65	
5.37.25	9800.00	2.21.7	132278.79—	5.53
3.27			1015.24	
5.40.52	9900.00	2.22.34	231263.55—	5.56
3.28			1005.03	
5.44.20	10000.00	2.24.0	230258.52—	6.0
3.27			995.04	
5.47.47	10100.00	2.25.26	229263.48 +	6.4
3.27			985.23	
5.51.14	10200.00	2.26.53	228278.25 +	6.7
3.28			976.61	
5.54.55	10300.00	2.28.19	227302.64	6.11
3.27			966.20	
5.58.22	10400.00	2.29.46	226336.44 +	6.14
3.28			956.94	

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſima quarta.	Logarithmi cum differentiis.	Partes ſexagenaria.
3. 28			956. 94	
6. 1. 50	10500.00	2. 31. 12	225379. 50	6. 18
3. 27			947. 87	
6. 5. 17	10600.00	2. 32. 38	224431. 63 —	6. 22
3. 28			938. 98	
6. 8. 45	10700.00	2. 34. 5	223492. 65 +	6. 25
3. 27			930. 24	
6. 12. 12	10800.00	2. 35. 31	222562. 41 +	6. 29
3. 28			921. 66	
6. 15. 40	10900.00	2. 36. 58	221640. 75	6. 32
3. 28			913. 25	
6. 18. 55	11000. 00	2. 38. 24	220727. 50 —	6. 36
3. 27			904. 99	
6. 22. 22	11100.00	2. 39. 50	219822. 51 +	6. 40
3. 28			896. 86	
6. 25. 50	11200.00	2. 41. 17	218925. 65	6. 43
3. 28			888. 90	
6. 29. 18	11300.00	2. 42. 43	218036. 75	6. 47
3. 27			881. 06	
6. 32. 45	11400.00	2. 44. 10	217155. 69	6. 50
3. 28			873. 37	
6. 36. 13	11500.00	2. 45. 36	216282. 32	6. 54
3. 28			865. 80	
6. 39. 41	11600.00	2. 47. 2	215416. 52 —	6. 58
3. 27			858. 38	
6. 43. 8	11700.00	2. 48. 29	214558. 14	7. 1
3. 28			851 07	
6. 46. 26	11800.00	2. 49. 55	213707. 07	7. 5
3. 28			843. 88	
6. 50. 4	11900.00	2. 51. 22	212863. 19 —	7. 8
3. 27			836. 83	
6. 53. 31	12000.00	2. 52. 48	212026. 36	7. 12
3. 28			829. 88	
6. 56. 59	12100.00	2. 54. 14	211196. 48	7. 16
3. 28			823. 05	
7. 0. 27	12200.00	2. 55. 41	210373. 43	7. 19
3. 28			816. 33	
7. 3. 55	12300.00	2. 57. 7	209557. 10	7. 23
3. 27			809. 72	
7. 7. 22	12400.00	2. 58. 34	208747. 38 —	7. 26
3. 28			803. 22	

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
3. 28			803.22	
7. 10. 50	12500.00	3. 0. 0	207944.16	7.30
3. 28			796.82	
7. 14. 18	12600.00	3. 1. 26	207147.34 +	7.34
3. 28			790.51	
7. 17.46	12700.00	3. 2. 53	206356.83 —	7.37
3. 28			784.32	
7. 21. 14	12800.00	3. 4. 19	205572.51	7.41
3. 28			778.22	
7. 24. 42	12900.00	3. 5. 46	204794.29 +	7.44
3. 28			772.20	
7. 28. 10	13000.00	3. 7. 12	204022.09 —	7.48
3. 29			766.29	
7. 31. 39	13100. 00	3. 8. 38	203255.80	7.52
3. 28			760.46	
7. 35. 7	13200.00	3. 10. 5	202495.34	7. 55
3. 28			754.72	
7. 38. 35	13300. 00	3. 11. 31	201740.62	7.59
3. 28			749.07	
7. 42. 3	13400.00	3. 12. 58	200991.55 +	8. 2
3. 28			743.50	
7. 45. 31	13500.00	3. 14. 24	200248.05 +	8. 6
3. 28			738.00	
7. 48. 59	13600.00	3. 15. 50	199510.05 +	8. 10
3. 29			732.61	
7. 22. 28	13700.00	3. 17. 17	198777.44	8. 13
3. 29			727.27	
7. 55. 56	13800.00	3. 18. 43	198050.17	8. 17
3. 28			722.03	
7. 59. 24	13900.00	3. 20. 10	197328.14	8. 20
3. 28			716.85	
8. 2. 52	14000.00	3. 21. 36	196611.29	8. 24
3. 28			711.74	
8. 6. 20	14100.00	3. 23. 2	195899.55 —	8. 28
3. 29			706.72	
8. 9. 49	14200.00	3. 24. 29	195192.83	8. 31
3. 28			701.76	
8. 13. 17	14300.00	3. 25. 55	194491.07 +	8. 35
3. 28			696.86	
8. 16. 45	14400.00	3. 27. 22	193794.21 —	8. 38
3. 29			692.05	

Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
3. 29			692.05	
8. 20. 14	14500. 00	3. 28. 48	193102.16	8. 42
3. 28			687.28	
8. 23. 42	14600.00	3. 30. 14	192414.88—	8. 46
3. 28			682.61	
8. 27. 10	14700.00	3. 31. 41	191732.27+	8. 49
3. 29			677.96	
8. 30. 39	14800.00	3. 33. 7	191054.31—	8. 53
3. 28			673.41	
8. 34. 7	14900.00	3. 34. 34	190380.90+	8. 56
3. 29			668.90	
8. 37. 36	15000.00	3. 36. 0	189712.00+	9. 0
3. 29			664.45	
8. 41. 5	15100.00	3. 37. 26	189047.55	9. 4
3. 28			660.07	
8. 44. 33	15200.00	3. 38. 53	188387.48	9. 7
3. 29			655.74	
8. 48. 2	15300.00	3. 40. 19	187731.74	9. 11
3. 29			651.47	
8. 51. 31	15400.00	3. 41. 46	187080.27+	9. 14
3. 28			647.25	
8. 54. 59	15500.00	3. 43. 12.	186433.02+	9. 18
3. 29			643.09	
8. 58. 28	15600.00	3. 44. 38	185789.93+	9. 22
3. 29			638.98	
9. 1. 57	15700.00	3. 46. 5	185150.95+	9. 25
3. 29			634.92	
9. 5. 26	15800.00	3. 47. 31	184516.03	9. 29
3. 29			630.92	
9. 8. 55	15900.00	3. 48. 58	183885.11+	9. 32
3. 30			626.96	
9. 12. 25	16000. 00	3. 50. 24	183258.15	9. 36
3. 29			623.06	
9. 15. 54	16100. 00	3. 51. 50	182635.09+	9. 40
3. 29			619.19	
9. 19. 23	16200.00	3. 53. 17	182015.90	9. 43
3. 29			615.38	
9. 22. 52	16300.00	3. 54. 43	181400.52	9. 47
3. 29			611.63	
9. 26. 21	16400.00	3. 56. 10	180788.89	9. 50
3. 30			607.90	

Arcus

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
3. 30			607.90	
9. 29. 51	16500.00	3. 57. 36	180180.99—	9 54
3. 29			604.24	
9. 33. 20	16600.00	3. 58 2	179576.75+	9. 58
3. 29			600.60	
9. 36.49	16700.00	4. 0. 29	178976.15+	10. 1
3. 29			597.01	
9. 40. 18	16800.00	4. 1. 55	178379.14—	10. 5
3. 29			593.48	
9. 43. 47	16900.00	4. 3. 22	177785.66	10. 8
3. 29			589.97	
9. 47. 16	17000.00	4. 4. 48	177195.69	10.12
3. 30			586.51	
9. 50. 46	17100.00	4. 6. 14	176609.18—	10.16
3. 29			583.09	
9. 54. 15	17200.00	4. 7. 41	176026.09—	10. 19
3. 29			579.72	
9. 57. 44	17300.00	4. 9. 7	175446.37	10. 23
3. 29			576.37	
10. 1. 13	17400.00	4.10. 34	174870.00 +	10. 26
3. 30			573.07	
10. 4. 43	17500.00	4. 12. 0	174296.93 +	10. 30
3. 29			569.79	
10. 8. 12	17600.00	4. 13. 26	173727.14—	10. 34
3. 30			566.58	
10. 11 42	17700. 00	4. 14. 53	173160.56	10. 37
3. 30			563.38	
10. 15. 12	17800.00	4. 16. 19	172597.18	10. 41
3. 30			560.23	
10. 18. 42	17900.00	4.17. 46	172036.95	10. 44
3. 29			557.10	
10. 22. 11	18000.00	4. 19. 12	171479.85—	10. 48
3. 30			554.02	
10. 25. 41	18100.00	4. 20. 38	170925.83	10. 52
3. 30			550.97	
10. 29. 11	18200.00	4. 22. 5	170374.86 +	10. 55
3. 30			547.94	
10. 32. 41	18300.00	4. 23. 31	169826.92—	10. 59
3. 30			544.96	
10. 36. 11	18400.00	4. 24. 58	169281.96—	11. 2
3. 29			542.01	

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
3. 29			542.01	
10.39.40	18500.00	4.26.24	168739.95	11. 6
3. 30			539.08	
10.43.10	18600.00	4.27.50	168200.87	11.10
3. 30			536.20	
10.46.40	18700.00	4.29.17	167664.67	11.13
3. 30			533.33	
10.50.10	18800.00	4.30.43	167131.34	11.17
3. 30			530.51	
10.53.40	18900.00	4.32.10	166600.83	11.20
3. 30			527.70	
10.57.10	19000.00	4.33.36	166073.13 —	11.24
3. 31			524.94	
10. 0.41	19100.00	4.35.2	165548.19	11.28
3. 30			522.19	
11. 4.11	19200.00	4.36.29	165026.00 —	11.31
3. 30			519.49	
11. 7.41	19300.00	4.37.55	164506.51 +	11.35
3. 30			516.79	
11.11.11	19400.00	4.39.22	163989.72 —	11.38
3. 30			514.15	
11.14.41	19500.00	4.40.48	163475.57 +	11.42
3. 31			511.50	
11.18.12	19600.00	4.42.14	162964.07 —	11.46
3. 30			508.91	
11.21.42	19700.00	4.43.41	162455.16	11.49
3. 30			506.33	
11.25.12	19800.00	4.45.7	161948.83 —	11.53
3. 30			503.78	
11.28.42	19900.00	4.46.34	161445.05	11.56
3. 31			501.25	
11.32.13	20000.00	4.48.0	160943.80 —	12. 0
3. 30			498.76	
11.35.43	20100.00	4.49.26	160445.04 +	12. 4
3. 31			496.28	
11.39.14	20200.00	4.50.53	159948.76 +	12. 7
3. 31			493.83	
11.42.45	20300.00	4.52.19	159454.39 +	12.11
3. 30			491.40	
11.46.15	20400.00	4.53.46	158963.53 +	12.14
3. 31			489.00	

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ARCUS Circuli cum differentiis.	SINUS ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	LOGARITHMI cum differentiis.	Partes ſexagenariæ.
3. 31			489.00	
11. 49. 46	20500.00	4. 55. 12	158474.53 +	12. 18
3. 31			486. 61	
11. 53. 17	20600.00	4. 56. 38	157987.92	12. 22
3. 31			484.26	
11. 56. 48	20700.00	4. 58. 5	157503.66 —	12. 25
3. 31			481.94	
12. 0. 19	20800.00	4. 59. 31	157021. 72 +	12. 29
3. 30			479.61	
12. 3. 49	20900.00	5. 0. 58	156542.11 —	12. 32
3. 31			477.33	
12. 7. 20	21000.00	5. 2. 24	156064.78	12. 26
3. 31			475.06	
12. 10. 51	21100 00	5. 3. 50	155589.72 —	12. 40
3. 31			472.81	
12. 14. 22	.1200.00	5. 5. 17	155116.91 —	12. 43
3. 31			470.59	
12. 14 53	21300.00	5. 6. 43	154646.32 —	12. 47
3. 31			468.39	
12. 24. 21	21400.00	5. 8. 10	154177. 93 +	12. 50
3. 31			466.20	
12. 24. 55	21500.00	5. 9. 36	153711. 73	12. 54
3. 32			464.04	
12. 28. 27	21600.00	5. 11. 2	153247.69 +	12. 58
3. 31			461.89	
12. 31. 58	21700.00	5. 12. 29	152785.80	13. 1
3. 31			459.77	
12. 35. 29	21800.00	5. 13. 55	152326.03	13. 5
3. 31			457.67	
12. 39. 0	21900. 00	5. 15. 22	151868.36	13. 8
3. 32			455.58	
12. 42. 32	22000. 00	5. 16. 48	151412.78 —	13. 12
3. 31			453.52	
12. 46. 3	22100.00	5. 18. 14	150959.26	13. 16
3. 31			451.47	
12. 49. 34	22200.00	5. 19. 41	150507.79 +	13. 19
3. 32			449.43	
12. 53. 6	22300.00	5. 21. 7	150058. 36 —	13. 23
3. 31			446.43	
12. 56. 37	22400.00	5. 22. 34	149610. 93	13. 26
3. 32			445. 44	

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
3. 32			445.44	
13. 0. 9	22500.00	5. 24. 0	149165.49	13. 30
3. 32			443.46	
13. 3. 41	22600.00	5. 25. 26	148722.03	13. 34
3. 32			441.50	
13. 7. 13	22700.00	5. 26. 53	148280.53	13. 37
3. 32			439.56	
13. 10. 45	22800.00	5. 28. 19	147840.97	13. 41
3. 32			432.64	
13. 14. 17	22900.00	5. 29. 46	147403.33 +	13. 44
3. 33			435.73	
13. 17. 50	23000.00	5. 31. 12	146967 60	13. 48
3. 32			433.84	
13. 21. 22	23100 00	5. 32. 38	146533.76	13. 52
3. 32			431.96	
13. 24. 54	23200.00	5. 34. 5	146101.80 —	13. 55
3. 32			430.11	
13. 28 26	23300.00	5. 35. 31	145671.69	13. 59
3. 32			428.27	
13. 31. 58	23400.00	5. 36. 58	145243 42	14. 2
3. 33			426.44	
13. 35. 31	23500.00	5. 38. 24	144816.98	14. 6
3. 32			424.63	
13. 39. 3	23600.00	5. 39. 50	144392.35	14. 10
3. 32			422.83	
13. 42. 35	23700.00	5. 41. 17	143969.52	14. 13
3. 32			421.05	
13. 46. 7	23800.00	5. 42. 43	143548.47—	14. 17
3. 33			419.29	
13. 49. 40	23900. 00	5. 44. 10	143129.18—	14. 20
3. 32			418.54	
13. 53. 12	24000.00	5. 45. 36	142711.64	14. 24
3. 32			415.80	
13. 56. 44	24100. 00	5. 47. 2	142295.84	14. 28
3. 33			414.08	
14. 0. 17	24200.00	5. 48. 29	141881.76	14. 31
3. 33			412.37	
14. 3. 50	24300.00	5. 49. 55	141469.39	14. 35
3. 32			410.68	
14. 7. 22	24400.00	5. 51. 22	141058.71	14. 38
3. 33			409.00	

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
3. 33			409.00	
14. 10. 55	24500.00	5. 52. 48	140649.71	14. 42
3. 33			407. 33	
14. 14. 28	24600.00	5. 54. 14	140242.38	14. 46
3. 33			405.68	
14. 18. 1	24700.00	5. 55. 41	139836.70	14. 49
3. 33			404.04	
14. 21. 34	24800.00	5. 57. 7	139432.66—	14. 53
3. 32			402. 42	
14. 25. 6	24900.00	5. 58. 34	139030.24	14. 56
3. 33			400. 80	
14. 28. 39	25000.00	6. 0. 0	138629.44	15. 0
3. 33			399. 20	
14. 32. 12	25100.00	6. 1. 26	138230.24—	15. 4
3. 33			397. 62	
14. 35. 45	25200.00	6. 2. 53	137832.62+	15. 7
3. 33			396. 04	
14. 39. 18	25300.00	6. 4. 19	137436.58+	15. 11
3. 33			394. 47	
14. 42. 51	25400.00	6. 5. 46	137042. 11—	15. 14
3. 34			392. 93	
14. 46. 25	25500.00	6. 7. 12	136649.18—	15. 18
3. 33			391. 39	
14. 49. 58	25600.00	6. 8. 38	136257. 79	15. 22
3. 33			389.87	
14. 53. 31	25700.00	6. 10. 5	135867. 92+	15. 25
3. 34			388.35	
14. 57. 5	25800.00	6. 11. 31	135479.57+	15. 29
3. 33			386. 84	
15. 0. 38	25900.00	6. 12. 58	135092.73—	15. 32
3. 34			385. 36	
15. 4. 12	26000.00	6. 14. 24	134707.37—	15. 36
3. 33			383. 88	
15. 7. 45	26100.00	6. 15. 50	134323.49	15. 40
3. 34			382.41	
15. 11. 19	26200.00	6. 17. 17	133941. 08	15. 43
3. 34			380. 95	
15. 14. 53	26300.00	6. 18. 43	133560. 13	15. 47
3. 33			379. 51	
15. 18. 26	26400.00	6. 20. 10	133180.62	15. 50
3. 34			378.07	

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſima quarta.	Logarithmi cum differentiis.	Partes ſexagenaria.
3. 34			378.07	
15. 22. 0	26500.00	6. 21. 36	132802.55	15. 54
3. 34			376.65	
15. 25. 34	26600.00	6. 23. 2	132425.90	15. 58
3. 35			375.23	
15. 29. 9	26700.00	6. 24. 29	132050.67 —	16. 1
3. 34			373.84	
15. 32. 43	26800.00	6. 25. 55	131676.83 +	16. 5
3. 34			372.43	
15. 36. 17	26900.00	6. 27. 22	131304.40	16. 8
3. 35			371.07	
15. 39. 52	27000.00	6. 28. 48	130933.33 +	16. 12
3. 34			369.67	
15. 43. 26	27100.00	6. 30. 14	130563.66 —	16. 16
3. 34			368.33	
15. 47. 0	27200.00	6. 31. 41	130195.33 —	16. 19
3. 35			366.98	
15. 50. 35	27300.00	6. 33. 7	129828.55	16. 23
3. 34			365.63	
15. 54. 9	27400.00	6. 34. 34	129462.72	16. 26
3. 35			364.30	
15. 57. 44	27500.00	6. 36. 0	129098.42 +	16. 30
3. 34			362.97	
16. 1. 18	27600.00	6. 37. 26	128735 45 —	16. 34
3. 35			361.67	
16. 4. 53	27700.00	6. 38. 53	128373.78	16. 37
3. 35			360.36	
16. 8. 28	27800.00	6. 40. 19	128013.42	16. 41
3. 34			359.07	
16. 12. 2	27900.00	6. 41. 46	127654.35	16. 44
3. 35			357.78	
16. 15. 37	28000.00	6. 43. 12	127296.57	16. 48
3. 35			356.51	
16. 19. 12	28100.00	6. 44. 38	126940.06 +	16. 52
3. 35			355.23	
16. 22. 47	28200.00	6. 46. 5	126584.83 —	16. 55
3. 35			353.98	
16. 26. 22	28300.00	6. 47. 31	126230.85 +	16. 59
3. 35			352.74	
16. 29. 57	28400.00	6. 48. 58	125878.11	17. 2
3. 36			351.50	

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Arcus Circuli cum differentiis.	*Sinus* ſeu Numeri abſoluti.	*Partes viceſimæ quartæ.*	*Logarithmi* cum differentiis.	*Partes ſexagenariæ.*
3. 36			351.50	
16. 33. 33	28500.00	6.50.24	125526.61 +	17. 6
3. 35			350.26	
16. 37. 8	28600.00	6. 51. 50	125176.35 +	17. 10
3. 35			349.04	
16.40.43	28700.00	6. 53. 17	124827.31	17. 13
3. 35			347.82	
16. 44.18	28800.00	6.54. 43	124479.49	17. 17
3. 36			346.63	
16.47.54	28900.00	6.56.10	124132.86	17. 20
3. 35			345.42	
16. 51. 29	29000.00	6. 57. 36	123787.44	17. 24
3. 35			344.24	
16. 55. 4	29100.00	6. 59. 2	123443.20 +	17. 28
3. 36			343.04	
16. 58. 40	29200.00	7. 0. 29	123100.16 −	17. 31
3. 35			341.89	
17. 2. 15	29300.00	7. 1. 55	122758.27	17. 35
3. 36			340.72	
17. 5. 51	29400.00	7. 3. 22	122417.55 +	17. 38
3. 36			339.55	
17. 9. 27	29500.00	7. 4. 48	122078.00 −	17. 42
3. 35			338.41	
17. 13. 2	29600.00	7. 6. 14	121739.59 −	17. 46
3. 36			337.27	
17. 16. 38	29700.00	7.7. 41	121402.32	17. 49
3. 36			336.14	
17.20.14	29800.00	7. 9. 7	121066.18 +	17. 53
3. 36			335.01	
17. 23. 50	29900.00	7.10.34	120731.17 +	17. 56
3. 37			333.89	
17.27.27	30000.00	7. 12. 0	120397.28 +	18. 0
3. 36			332.78	
17. 31. 3	30100.00	7. 13. 26	120064.50 +	18. 4
3. 36			331.67	
17.34. 39	30200.00	7. 14. 53	119732.83	18. 7
3. 37			330.58	
17. 36. 16	30300.00	7. 16. 19	119402.25	18. 11
3. 36			329.49	
17. 41. 52	30400.00	7.17. 46	119072.76	18. 14
3. 37			328.41	

Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
3. 37			328.41	
17. 45. 29	30500. 00	7. 19. 12	118744. 35 +	18. 18
3. 37			327.33	
17. 49. 6	30600. 00	7. 20. 38	118417. 02	18. 22
3. 36			326. 26	
17. 52. 42	30700. 00	7. 22. 5	118090. 76 −	18. 25
3. 37			325.21	
17. 56. 19	30800. 00	7. 23. 31	117765. 55 +	18. 29
3. 37			324. 15	
17. 59. 56	30900. 00	7. 24. 58	117441. 40 +	18. 32
3. 37			323. 10	
18. 3. 33	31000. 00	7. 26. 24	117118. 30 +	18. 36
3. 37			322.06	
18. 7. 10	31100. 00	7. 27. 50	116796. 24	18. 40
3. 37			321. 03	
18. 10. 47	31200. 00	7. 29. 17	116475. 21 +	18. 43
3. 37			320. 00	
18. 14. 24	31300. 00	7. 30. 43	116155. 21 +	18. 47
3. 38			318. 98	
18. 18. 2	31400. 00	7. 32. 10	115836. 23 +	18. 50
3. 37			317. 96	
18. 21. 39	31500. 00	7. 33. 36.	115518. 27	18. 54
3. 37			316. 96	
18. 25. 16	31600. 00	7. 35. 2	115201. 31	18. 58
3. 37			315. 96	
18. 28. 53	31700. 00	7. 36. 29	114885. 35 +	19. 1
3. 38			314. 96	
18. 32. 31	31800. 00	7. 37. 55	114570. 39 +	19. 5
3. 37			313. 97	
18. 36. 8	31900. 00	7. 39. 22	114256. 42 +	19. 8
3. 38			312. 99	
18. 39. 46	32000. 00	7. 40. 48	113943. 43	19. 12
3. 38			312. 01	
18. 43. 24	32100. 00	7. 42. 14	113631. 42	19. 16
3. 38			311. 05	
18. 47. 2	32200. 00	7. 43. 41	113320. 37 +	19. 19
3. 38			310. 07	
18. 50. 40	32300. 00	7. 45. 7	113010. 30	19. 23
3. 39			309. 12	
18. 54. 19	32400. 00	7. 46. 34	112701. 18	19. 26
3. 38			308. 17	

Arcus

ARCUS Circuli cum differentiis.	SINUS ſeu Numeri abſoluti.	Partes viceſima quarta.	LOGARITHMI cum differentiis.	Partes ſexagenaria.
3. 38			308.17	
18. 57. 57	32500. 00	7. 48. 0	112393.01	19. 30
3. 38			307.21	
19. 1. 35	32600. 00	7. 49. 26	112085. 80	19. 34
3. 38			306. 29	
19. 5. 13	32700.00	7. 50. 53	111779. 51 +	19. 37
3. 39			305. 34	
19. 8. 52	32800.00	7. 52. 19	111474.17	19. 41
3. 38			304. 41	
19. 12. 30	32900. 00	7. 53. 46	111169. 76—	19. 44
3. 38			303. 49	
19. 16. 8	33000. 00	7. 55. 12	110866. 27—	19. 48
3. 39			302. 58	
19. 19. 47	33100. 00	7. 56. 38	110563. 69 +	19. 52
3. 38			301.66	
19. 23. 25	33200. 00	7. 58. 5	110262. 03 +	19. 55
3. 39			300.75	
19. 22. 4	33300.00	7. 59. 31	109961.28	19. 59
3. 38			299.85	
19. 30. 42	33400. 00	8. 0. 58	109661. 43 +	20. 2
3. 39			298. 95	
19. 34. 21	33500.00	8. 2. 24	109362. 48	20. 6
3. 39			298.06	
19. 38. 0	33600.00	8. 3. 50	109064. 42—	20. 10
3. 39			297.18	
19. 41. 39	33700.00	8. 5. 17	108767. 24—	20. 13
3. 39			296 30	
19. 45. 18	33800. 00	8. 6. 43	108470. 94	20. 17
3. 40			295. 42	
19. 48. 58	33900. 00	8. 8. 10	108175. 52	20. 20
3. 39			294. 55	
19. 52. 37	34000. 00	8. 9. 36	107880. 97	20. 24
3. 39			293. 69	
19. 56. 16	34100. 00	8. 11. 2	107587. 28 +	20. 28
3. 40			292. 82	
19. 59. 56	34200. 00	8. 12. 29	107294 46—	20. 31
3. 39			291. 97	
20. 3. 35	34300. 00	8. 13. 55	107002. 94—	20. 35
3. 39			291. 12	
20. 7. 14	34400. 00	8. 15. 21	106711. 37—	20. 38
3. 40			290. 28	

ARCUS Circuli cum differentiis.	SINUS ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	LOGARITHMI cum differentiis.	Partes ſexagenariæ.
3. 40			290.28	
20.10.54	34500.00	8.10.48	106421.09	20.42
3. 40			289.44	
20.14.34	34600.00	8.18.14	106131.65	20.46
3. 39			288.60	
20. 18. 13	34700.00	8.19.41	105843.05+	20.49
3. 40			287.77	
20. 21. 53	34800.00	8. 21. 7	105555.28+	20. 53
3. 40			286.94.	
20. 25. 33	34900.00	8. 22. 34	105268.34	20. 56
3. 41			286.13	
20.29.14	35000.00	8. 24. 0	104982.21+	21. 0
3. 40			285.30	
20. 32. 54	35100.00	8. 25.26	104696.91	21. 4
3. 40			284.49	
20. 36. 34	35200. 00	8. 26. 53	104412.42—	21. 7
3. 40			283.70	
20.40.14	35300.00	8.28.19	104128.72+	21. 11
3. 41			282.88	
20. 43. 55	35400.00	8.29.46	103845.84	21. 14
3. 40			282.09	
20. 47.35	35500.00	8. 31. 12.	103563.75	21. 18
3. 41			281.29	
20. 51. 16	35600.00	8. 32.38	103282.46—	21. 22
3. 41			280.50	
20. 54.57	35700.00	8. 34. 5	103001.96—	21. 25
3. 41			279.73	
20. 58. 38	35800.00	8. 35. 31	102722.23	21. 29
3. 42			278.94	
21. 2. 20	35900.00	8. 36. 58	102443.20	21. 32
3. 41			278.16	
21. 6. 1	36000. 00	8. 38. 24	102165.13—	21. 36
3. 41			277.39	
21. 9. 42	36100.00	8.39.50	101887.74—	21. 40
3. 41			276.63	
21. 13. 23	36200.00	8. 41. 17	101611.11	21. 43
3. 42			275.86	
21. 17. 5	36300.00	8. 42. 43	101335. 25	21. 47
3. 41			275.11	
21.20.46	36400.00	8.44.10	101060.14+	21. 50
3. 42			274.34	

ARCUS

Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
3. 42			274.34	
21. 24. 28	36500.00	8. 45. 36	100785. 80—	21. 54
3. 41			273. 60	
21. 28. 9	36600.00	8. 47 2	100512. 20—	21. 58
3. 42			272. 86	
21. 31. 51	36700.00	8. 48. 29	100239. 34	22. 1
3. 41			272. 10	
21. 35. 32	36800.00	8. 49. 55	99967. 24	22. 5
3. 42			271. 38	
21. 39. 14	36900.00	8. 51. 22	99695. 86-+	22. 8
3. 42			270. 63	
21. 42. 56	37000.00	8. 52. 48	99425. 23	22. 12
3. 41			269. 90	
21. 46. 37	37100.00	8. 54. 14	99155. 33—	22. 16
3. 42			269. 18	
21. 50. 19	37200.00	8. 55. 41	98886. 15	22. 19
3. 42			268. 46	
21. 54. 1	37300.00	8. 57. 7	98617. 69	22. 23
3. 42			267. 74	
21. 57. 43	37400.00	8. 58. 34	98349. 95	22. 26
3. 43			267. 02	
22. 1. 26	37500.00	9. 0. 0	98082. 93—	22. 30
3. 42			266. 31	
22. 5. 8	37600.00	9. 1. 26	97816. 62	22. 34
3. 43			265. 61	
22. 8. 51	37700.00	9. 2. 53	97551. 01	22. 37
3. 43			264. 90	
22. 12. 34	37800.00	9. 4. 19	97286. 11	22. 41
3. 43			264. 20	
22. 16. 17	37900.00	9. 5. 46	97021. 91	22. 44
3. 44			263. 50	
22. 20. 1	38000.00	9. 7. 12	96758. 41—	22. 48
3. 43			262. 82	
22. 23. 44	38100.00	9. 8. 38	96495. 59-+	22. 52
3. 43			262. 12	
22. 27. 27	38200.00	9. 10. 5	96233. 47	22. 55
3. 44			261. 44	
22. 31. 11	38300.00	9. 11. 31	95972. 03	22. 59
3. 43			260. 75	
22. 34. 54	38400.00	9. 12. 58	95711. 28—	23. 2
3. 44			260. 08	

Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſima quarta.	Logarithmi cum differentiis.	Partes ſexagenaria.
3. 44			260.08	
22. 38. 38	38500.00	9.14.24	95451.20	23. 6
3. 43			259.41	
22. 42. 21	38600.00	9. 15. 50	95191.79 +	23. 10
3. 44			258.73	
22. 46. 5	38700.00	9.17.17	94933.06	23. 13
3. 44			258.06	
22. 49. 49	38800.00	9. 18. 43	94675.00 —	23. 17
3. 43			257.40	
22. 53. 32	38900.00	9.20.10	94417.60	23. 20
3. 44			256.75	
22. 57. 16	39000.00	9. 21. 36	94160.85 +	23. 24
3. 44			256.07	
23. 1. 0	39100.00	9. 23. 2	93904.78 —	23. 28
3. 44			255.43	
23. 4. 44	39200.00	9. 24. 29	93649.35 —	23. 31
3. 45			254.78	
23. 8. 29	39300.00	9. 25. 55	93394.57	23. 35
3. 44			254.13	
23. 12. 13	39400.00	9.27.22	93140.44	23. 38
3. 45			253.49	
23. 15. 58	39500.00	9.28.48	92886.95 +	23. 42
3. 45			252.84	
23. 19. 43	39600.00	9. 30.14	92634.11 —	23. 46
3. 45			252.21	
23. 23. 28	39700.00	9.31. 41	92381.90	23. 49
3. 44			251.57	
23. 27. 12	39800.00	9. 33. 7	92130.33	23. 53
3. 45			250.94	
23. 30. 57	39900.00	9.34.34	91879.39	23. 56
3. 45			250.31	
23. 34. 42	40000.00	9. 36. 0	91629.08 —	24. 0
3. 45			249.69	
23. 38. 27	40100.00	9.37.26	91379.39	24. 4
3. 45			249.07	
23. 42. 12	40200.00	9. 38. 53	91130.32 +	24. 7
3. 46			248.45	
23. 45. 58	40300.00	9.40.19	90881.87	24. 11
3. 45			247.83	
23. 49. 43	40400.00	9.41.46	90634.04 +	24. 14
3. 46			247.22	

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ARCUS Circuli cum differentiis.	SINUS ſeu Numeri abſoluti.	Partes viceſima quarta.	LOGARITHMI cum differentiis.	Partes ſexagenariæ.
3. 46			247.22	
23. 53. 29	40500.00	9. 43. 12	90386.82+	24. 18
3. 46			246.61	
23. 57. 15	40600.00	9. 44. 38	90140.21+	24. 22
3. 46			246.00	
24. 1. 1	40700.00	9. 46. 5	89894.21+	24. 25
3. 45			245.40	
24. 4. 46	40800.00	9. 47. 31	89648.81+	24. 29
3. 46			244.79	
24. 8. 32	40900.00	9. 48. 58	89404.02—	24. 32
3. 46			244.21	
24. 12. 18	41000.00	9. 50. 24	89159.81+	24. 36
3. 46			243.60	
24. 16. 4	41100.00	9. 51. 50	88916.21	24. 40
3. 47			243.01	
24. 19. 51	41200.00	9. 53. 17	88673.20	24. 43
3. 47			242.43	
24. 23. 38	41300.00	9. 54. 43	88430.77	24. 47
3. 46			241.83	
24. 27. 24	41400.00	9. 56. 10	88188.94—	24. 50
3. 47			241.26	
24. 31. 11	41500.00	9. 57. 36	87947.68	24. 54
3. 47			240.68	
24. 34. 58	41600.00	9. 59. 2	87707.00+	24. 58
3. 47			240.09	
24. 38. 45	41700.00	10. 0. 29	87466.91	25. 1
3. 46			239.52	
24. 42. 31	41800.00	10. 1. 55	87227.39—	25. 5
3. 47			238.95	
24. 46. 18	41900.00	10. 3. 22	86988.44—	25. 8
3. 47			238.38	
24. 50. 5	42000.00	10. 4. 48	86750.06	25. 12
3. 47			237.81	
24. 53. 52	42100.00	10. 6. 14	86512.25—	25. 16
3. 48			237.25	
24. 57. 40	42200.00	10. 7. 41	86275.00—	25. 19
3. 47			236.69	
25. 1. 27	42300.00	10. 9. 7	86038.38+	25. 23
3. 48			236.12	
25. 5. 15	42400.00	10. 10. 34	85802.19—	25. 26
3. 48			235.57	

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſima quarta.	Logarithmi cum differentiis.	Partes ſexagenaria.
3. 48			235.57	
25. 8. 3	42500.00	10.12.0	85566.62—	25. 30
3. 48			235.02	
25. 12. 51	42600.00	10.13.26	85331.60—	25. 34
3. 49			234.47	
25. 16.40	42700.00	10.14.53	85097.13	25. 37
3. 48			233.92	
25.20.28	42800.00	10.16.19	84863.21+	25. 41
3. 48			233.37	
25. 24.16	42900.00	10.17.46	84629.84	25. 44
3. 48			232.83	
25. 28. 4	43000.00	10.19. 12	84397. 11	25. 48
3. 48			232.27	
25. 31. 52	43100.00	10.20.38	84164.74	25. 52
3. 49			231.77	
25. 35. 41	43200.00	10.22. 5	83932.97+	25. 55
3. 48			231.21	
25. 39. 29	43300.00	10. 23. 31	83701.76—	25. 59
3. 49			230.68	
25. 43. 18	43400.00	10.24.58	83471.08	26. 2
3. 49			230.15	
25. 47. 7	43500.00	10.26.24	83240.98—	26. 6
3. 49			229.62	
25. 50. 56	43600.00	10. 27.50	83011. 31	26. 10
3. 50			229.10	
25.54.46	43700.00	10.29. 17	82782.21+	26. 13
3. 49			228.57	
25. 58. 35	43800.00	10.30. 43	82553. 64	26. 17
3. 49			228.05	
26. 2. 24	43900.00	10. 32. 10	82325. 59	26. 20
3. 50			227.53	
26. 6. 14	44000.00	10. 33. 36	82098.06—	26. 24
3. 49			227.02	
26. 10. 3	44100.00	10. 35. 2	81871.04	26. 28
3. 50			226.50	
26. 13. 53	44200.00	10. 36.29	81644.54	26. 31
3. 50			225.99	
26. 17.43	44300.00	10. 37. 55	81418. 55+	26. 35
3. 50			225.48	
26. 21. 33	44400.00	10.39. 22	81193. 07+	26. 38
3. 51			224.97	

Arcus

Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
3. 51			224.97	
26. 25. 24	44500.00	10. 40. 48	80968.10	26. 42
3. 50			224.46	
26. 29. 14	44600.00	10. 42. 14	80743.64—	26. 46
3. 51			223.97	
26. 33. 5	44700.00	10. 43. 41	80519.67	26. 49
3. 51			223.46	
26. 36. 56	44800.00	10. 45. 7	80296.21	26. 53
3. 50			222.97	
26. 40. 46	44900.00	10. 46. 34	80073.24	26. 56
3. 51			222.47	
26. 44. 37	45000.00	10. 48. 0	79850.77	27. 0
3. 51			221.97	
26. 48. 28	45100.00	10. 49. 26	79628.80—	27. 4
3. 51			221.49	
26. 52. 19	45200.00	10. 50. 53	79407.31	27. 7
3. 51			220.99	
26. 56. 10	45300.00	10. 52. 19	79186.32	27. 11
3. 52			220.51	
27. 0. 2	45400.00	10. 53. 46	78965.81	27. 14
3. 51			220.02	
27. 3. 53	45500.00	10. 55. 12	78745.79	27. 18
3. 52			219.54	
27. 7. 45	45600.00	10. 56. 38	78526.25	27. 22
3. 52			219.06	
27. 11. 37	45700.00	10. 58. 5	78307.19	27. 25
3. 52			218.58	
27. 14. 29	45800.00	10. 59. 31	78088.61+	27. 29
3. 52			218.10	
27. 18. 21	45900.00	11. 0. 58	77870.51	27. 32
3. 53			217.63	
27. 23. 14	46000.00	11. 2. 24	77652.88	27. 36
3. 52			217.15	
27. 27. 6	46100.00	11. 3. 50	77435.73—	27. 40
3. 53			216.69	
27. 30. 59	46200.00	11. 5. 17	77219.04	27. 43
3. 52			216.21	
27. 34. 51	46300.00	11. 6. 43	77002.83—	27. 47
3. 53			215.75	
27. 38. 44	46400.00	11. 8. 10	76787.08—	27. 50
3. 53			215.29	

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3. 53			215.29	
27.42.37	46500.00	11. 9. 36	76571.79	27. 54
3. 53			214.82	
27.46.30	46600.00	11. 11. 2	76356.97	27. 58
3. 54			214.36	
27.50.24	46700.00	11. 12. 29	76142.61—	28. 1
3. 53			213.91	
27.54.17	46800.00	11. 13. 55	75928.70	28. 5
3. 54			213.45	
27.58.11	46900.00	11. 15. 22	75715.25+	28. 8
3. 53			212.99	
28. 2. 4	47000.00	11. 16. 48	75502.26	28. 12
3. 54			212.54	
28. 5. 58	47100.00	11. 18. 14	75289.72	28. 16
3. 54			212.09	
28. 9. 52	47200.00	11. 19. 41	75077.63	28. 19
3. 54			211.64	
28.13.46	47300.00	11. 21. 7	74865.99	28. 23
3. 54			211.19	
28.17.40	47400.00	11. 22. 34	74654.80	28. 26
3. 55			210.75	
28.21.35	47500.00	11. 24. 0	74444.05	28. 30
3. 54			210.30	
28.25.29	47600.00	11. 25. 26	74233.75—	28. 34
3. 55			209.87	
28.29.24	47700.00	11. 26. 53	74023.88	28. 37
3. 54			209.42	
28.33.18	47800.00	11. 28. 19	73814.46—	28. 41
3. 55			208.99	
28.37.13	47900.00	11. 29. 46	73605.47	28. 44
3. 55			208.55	
28. 41. 8	48000.00	11. 31. 12	73396.92	28. 48
3. 55			208.12	
28. 45. 3	48100.00	11. 32. 38	73188.80+	28. 52
3. 56			207.68	
28.48.59	48200.00	11. 34. 5	72981.12	28. 55
3. 55			207.25	
28.52.54	48300.00	11. 35. 31	72773.87—	28. 59
3. 56			206.83	
28.56.50	48400.00	11. 36. 58	72567.04	29. 2
3. 55			206.40	

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3. 55			206.40	
29. 0. 45	48500. 00	11. 38. 24	72360.64	29. 6
3. 56			205.97	
29. 4. 41	48600. 00	11. 39. 50	72154. 67	29. 10
3. 56			205.55	
29. 8. 37	48700. 00	11. 41. 17	71949. 12	29. 13
3. 56			205. 13	
29. 12. 33	48800. 00	11. 42. 43	71743.99	29. 17
3. 57			204.71	
29. 16. 30	48900. 00	11. 44. 10	71539. 28	29. 20
3. 56			204.29	
29. 20. 26	49000. 00	11. 45. 36	71334 99	29. 24
3. 57			203. 87	
29. 24. 23	49100. 00	11. 47. 2	71131. 12 —	29. 28
3. 57			203.46	
29. 28. 20	49200. 00	11. 48. 29	70927. 66	29. 31
3. 57			203. 05	
29. 32. 17	49300. 00	11. 49. 55	70724. 61 +	29. 35
3. 58			202. 63	
29. 36. 15	49400. 00	11. 51. 22	70521. 98	29. 38
3. 57			202. 23	
29. 40. 12	49500. 00	11. 52. 48	70319. 75 +	29. 42
3. 57			201. 81	
29. 44. 9	49600. 00	11. 54. 14	70117. 94 —	29. 46
3. 58			201. 41	
29. 48. 7	49700. 00	11. 55. 41	69916. 53 —	29. 49
3. 57			201 01	
29. 52. 4	49800. 00	11. 57. 7	69715. 52	29. 53
3. 58			200. 60	
29. 56. 2	49900. 00	11. 58. 34	69514. 92	29. 56
3. 58			200. 20	
30. 0. 0	50000. 00	12. 0. 0	69314. 72	30. 0
3. 58			199. 80	
30. 3. 58	50100. 00	12. 1. 26	69114. 92	30. 4
3. 59			199. 40	
30. 7. 57	50200. 00	12. 2. 53	68915. 52 —	30. 7
3. 58			199. 01	
30. 11. 55	50300. 00	12. 4. 19	68716. 51 +	30. 11
3. 59			198. 61	
30. 15. 54	50400. 00	12. 5. 46	68517. 90 +	30. 14
3. 59			198. 21	

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	*Partes viceſimæ quartæ.*	Logarithmi cum differentiis.	*Partes ſexagenariæ.*
3. 59			198.21	
30. 19. 53	50500. 00	12. 7. 12	68319.69	30. 18
3. 59			197. 83	
30. 23. 52	50600.00	12. 8. 38	68121.86 +	30. 22
4. 0			197.43	
30. 27. 52	50700.00	12. 10. 5	67924.43	30. 25
3. 59			197.04	
30. 31. 51	50800.00	12. 11. 31	67727.39 –	30. 29
4. 0			196.66	
30. 35. 51	50900.00	12. 12. 58	67530.73 –	30. 32
4. 0			196.27	
30. 39. 51	51000. 00	12. 14. 24	67334.46 –	30. 36
4. 0			195.89	
30. 43. 51	51100. 00	12. 15. 50	67138.57	30. 40
4. 1			195.50	
30. 47. 52	51200.00	12. 17. 17	66943. 07	30. 43
4. 0			195.12	
30. 51. 52	51300. 00	12. 18. 43	66747.95	30. 47
4. 0			194.75	
30. 55. 52	51400. 00	12. 20. 10	66553.20 +	30. 50
4. 1			194.36	
30. 59. 53	51500. 00	12. 21. 36	66358.84	30 54
4. 0			193.99	
31. 3. 53	51600.00	12. 23. 2	66164.85 +	30. 58
4. 1			193. 61	
31. 7. 54	51700. 00	12. 24. 29	65971.24 +	31. 1
4. 1			193.23	
31. 11. 55	51800. 00	12. 25. 55	65778.01 –	31. 5
4. 1			192. 87	
31. 15. 56	51900. 00	12. 27. 22	65585.14	31. 8
4. 1			192.49	
31. 19. 57	52000. 00	12. 28. 48	65392. 65 –	31. 12
4. 2			192.12	
31. 23. 59	52100. 00	12. 30. 14	65200.53 –	31. 16
4. 1			191.76	
31. 28. 0	52200. 00	12. 31. 41	65008.77	31. 19
4. 2			191.39	
31. 32. 2	52300. 00	12. 33. 7	64817.38	31. 23
4. 2			191.02	
31. 36. 4	52400. 00	12. 34. 34	64626.36	31. 26
4. 2			190.65	

Arcus

Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
4. 2			190.65	
31. 40. 6	52500.00	12. 36. 0	64435.71—	31. 30
4. 3			190.30	
31. 44. 9	52600.00	12.37.26	64245. 41	31. 34
4. 2			189.94	
31. 48. 11	52700.00	12.38.53	64055.47+	31. 37
4. 3			189.57	
31. 52. 14	52800.00	12.40.19	63865. 90	31. 41
4. 3			189.21	
31. 56. 17	52900.00	12.41.46	63676.69—	31. 44
4. 3			188.86	
32. 0. 20	53000.00	12.43. 12	63487.83	31. 48
4. 4			188.50	
32. 4. 24	53100 00	12.44.38	63299.33	31. 52
4. 3			188.15	
32. 8. 27	53200. 00	12.46.5	63111. 18	31. 55
4. 4			187.79	
32. 12 31	53300.00	12. 47.31	62923.39	31. 59
4. 4			187.44	
32. 16. 35	53400. 00	12.48.58	62735.95—	32. 2
4. 4			187.10	
32. 20.39	53500.00	12.50.24	62548.85+	32. 6
4. 4			186.74	
32.24.43	53600. 00	12. 51.50	62362. 11+	32. 10
4. 5			186.38	
32.28.48	53700. 00	12.53.17	62175.73+	32. 13
4. 4			186.05	
32. 32. 52	53800.00	12. 54. 43	61989.68	32. 17
4. 5			185.71	
32. 36. 57	53900 00	12. 56. 10	61803. 97	32. 20
4. 5			185.36	
32. 41. 2	54000. 00	12. 57. 36	61618.61+	32. 24
4. 5			185.00	
32. 45. 7	54100. 00	12. 59. 2	61433.61	32. 28
4. 5			184.67	
32.49. 12	54200.00	13. 0. 29	61248.94—	32. 31
4. 6			184.34	
32. 53. 18	54300.00	13. 1. 55	61064.60	32. 35
4. 5			183.99	
32. 57. 23	54400.00	13. 3. 22	60880. 61—	32. 38
4. 6			183.66	

Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
4. 6			183.66	
33. 1. 29	54500. 00	13. 4. 48	60696.95	32. 42
4. 6			183. 32	
33. 5. 35	54600.00	13. 6. 14	60513.63	32. 46
4. 6			182.98	
33. 9. 41	54700.00	13. 7. 41	60330.65	32. 49
4. 7			182.65	
33. 13. 48	54800.00	13. 9. 7	60148.00	32. 53
4. 6			182.31	
33. 17. 54	54900.00	13. 10. 34	59965.69	32. 56
4. 7			181. 99	
33. 22. 2	55000.00	13. 12. 0	59783.70+	33. 0
4. 7			181.65	
33. 26. 8	55100. 00	13. 13. 26	59602.05+	33. 4
4. 7			181.32	
33. 30. 15	55200. 00	13. 14. 53	59420.73	33. 7
4. 8			181.00	
33. 34. 23	55300. 00	13. 16. 19	59239.73	33. 11
4. 7			180.67	
33. 38. 30	55400. 00	13. 17. 46	59059.06	33. 14
4. 8			180. 34	
33. 42. 38	55500. 00	13. 19. 12	58878.72	33. 18
4. 8			180.02	
33. 46. 46	55600. 00	13. 20. 38	58698.70	33. 22
4. 8			179.70	
33. 50. 54	55700. 00	13. 22. 5	58519.00	33. 25
4. 9			179.37	
33. 55. 3	55800. 00	13. 23. 31	58339.63	33. 29
4. 8			179.05	
33. 59. 11	55900. 00	13. 24. 58	58160.58	33. 32
4. 9			178.73	
34. 3. 20	56000.00	13. 26. 24	57981.85	33. 36
4. 9			178.41	
34. 7. 29	56100. 00	13. 27. 50	57803.44	33. 40
4. 9			178.10	
34. 11. 38	56200. 00	13. 29. 17	57625.34+	33. 43
4. 10			177.77	
34. 15. 48	56300. 00	13. 30. 43	57447.57	33. 47
4. 9			177.46	
34. 19. 57	56400. 00	13. 32. 10	57270.11—	33. 50
4. 10			177.16	

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4. 10			177.16	
34. 24. 7	56500. 00	13. 33. 36	57092.95+	33. 54
4. 10			176.82	
34. 28. 17	56600. 00	13. 35. 2	56916. 13+	33. 58
4. 11			176.53	
34. 32. 28	56700. 00	13. 36. 29	56739.60+	34. 1
4. 10			176.21	
34. 36. 38	56800. 00	13. 37. 55	56563.39	34. 5
4. 11			175.90	
34. 40. 49	56900. 00	13. 39. 22	56387.49−	34. 8
4. 11			175.60	
34. 45. 0	57000. 00	13. 40. 48	56211.89+	34. 12
4. 11			175.28	
34. 49. 11	57100. 00	13. 42. 14	56036.61	34. 16
4. 12			174.98	
34. 53. 23	57200. 00	13. 43. 41	55861. 63+	34. 19
4. 11			174.67	
34. 57. 34	57300. 00	13. 45. 7	55686.96−	34. 23
4. 12			174.37	
35. 1. 46	57400. 00	13. 46. 34	55512. 59	34. 26
4. 12			174.06	
35. 5. 58	57500. 00	13. 48. 0	55338. 53−	34. 30
4. 12			173.76	
35. 10. 11	57600. 00	13. 49. 26	55164.77−	34. 34
4. 12			173.47	
35. 14. 23	57700. 00	13. 50. 53	54991.30+	34. 37
4. 13			173.16	
35. 18. 36	57800. 00	13. 52. 19	54818.14	34. 41
4. 13			172.86	
35. 22. 49	57900. 00	13. 53. 46	54645.28	34. 44
4. 13			172.56	
35. 27. 2	58000. 00	13. 55. 12	54472.72	34. 48
4. 14			172.27	
35. 31. 16	58100. 00	13. 56. 38	54300.45+	34. 52
4. 13			171.97	
35. 35. 29	58200. 00	13. 58. 5	54128.48+	34. 55
4. 14			171.67	
35. 39. 43	58300. 00	13. 59. 31	53956. 81+	34. 59
4. 14			171.37	
35. 43. 57	58400. 00	14. 0. 58	53785.44−	35. 2
4. 14			171.09	

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
4. 14			171.09	
35. 48. 11	58500.00	14. 2. 24	53614. 35 —	35. 6
4. 15			170.80	
35. 52. 26	58600.00	14. 3. 50	53443. 55	35. 10
4. 14			170.50	
35. 56. 40	58700.00	14. 5. 17	53273. 05 —	35. 13
4. 15			170.22	
36. 0. 55	58800.00	14. 6. 43	53102. 83 +	35. 17
4. 15			169.92	
36. 5. 10	58900.00	14. 8. 10	52932. 91	35. 20
4. 16			169.63	
36. 9. 26	59000.00	14. 9. 36	52763. 28 —	35. 24
4. 15			169.35	
36. 13. 41	59100.00	14. 11. 2	52593. 93 —	35. 28
4. 16			169.06	
36. 17. 57	59200.00	14. 12. 29	52424. 87 —	35. 31
4. 16			168.78	
36. 22. 13	59300.00	14. 13. 55	52256. 09	35. 35
4. 17			168.49	
36. 26. 30	59400.00	14. 15. 22	52087. 60	35. 38
4. 16			168.21	
36. 30. 46	59500.00	14. 16. 48	51919. 39	35. 42
4. 17			167.93	
36. 35. 3	59600.00	14. 18. 14	51751. 46 +	35. 46
4. 17			167.64	
36. 39. 20	59700.00	14. 19. 41	51583. 82	35. 49
4. 18			167.37	
36. 43. 38	59800.00	14. 21. 7	51416. 45 +	35. 53
4. 17			167.08	
36. 47. 55	59900.00	14. 22. 34	51249. 37	35. 56
4. 18			166.81	
36. 52. 13	60000.00	14. 24. 0	51082. 56 +	36. 0
4. 18			166.52	
36. 56. 31	60100.00	14. 25. 26	50916. 04 —	36. 4
4. 19			166.20	
37. 0. 50	60200.00	14. 26. 53	50749. 78 +	36. 7
4. 19			165.97	
37. 5. 9	60300.00	14. 28. 19	50583. 81	36. 11
4. 18			165.70	
37. 9. 27	60400.00	14. 29. 46	50418. 11	36. 14
4. 19			165.43	

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſima quarta.	Logarithmi cum differentiis.	Partes ſexagenaria.
4. 19			165.43	
37. 13. 46	60500.00	14. 31. 12	50252.68+	36. 18
4. 19			165.15	
37. 18. 5	60600.00	14. 32. 38	50087.53	36. 22
4. 20			164.88	
37. 22. 25	60700.00	14. 34. 5	49922.65	36. 25
4. 19			164.61	
37. 26. 44	60800.00	14. 35. 31	49758.04	36. 29
4. 20			164.34	
37. 31. 4	60900.00	14. 36. 58	49593.70+	36. 32
4. 20			164.07	
37. 35. 24	61000.00	14. 38. 24	49429.63+	36. 36
4. 21			163.80	
37. 39. 45	61100.00	14. 39. 50	49265.83+	36. 40
4. 20			163.53	
37. 44. 5	61200.00	14. 41. 17	49102.30	36. 43
4. 21			163.26	
37. 48. 26	61300.00	14. 42. 43	48939.04−	36. 47
4. 21			163.00	
37. 52. 47	61400.00	14. 44. 10	48776.04−	36. 50
4. 22			162.74	
37. 57. 9	61500.00	14. 45. 36	48613.30+	36. 54
4. 21			162.47	
38. 1. 30	61600.00	14. 47. 2	48450.83+	36. 58
4. 22			162.20	
38. 5. 52	61700.00	14. 48. 29	48288.63	37. 1
4. 22			161.95	
38. 10. 4	61800.00	14. 49. 55	48126.68+	37. 5
4. 23			161.68	
38. 14. 37	61900.00	14. 51. 22	47965.00−	37. 8
4. 22			161.42	
38. 18. 59	62000.00	14. 52. 48	47803.58+	37. 12
4. 23			161.16	
38. 23. 22	62100.00	14. 54. 14	47642.42	37. 16
4. 24			160.90	
38. 27. 46	62200.00	14. 55. 41	47481.52	37. 19
4. 23			160.64	
38. 32. 9	62300.00	14. 57. 7	47320.88	37. 23
4. 24			160.39	
38. 36. 33	62400.00	14. 58. 34	47160.49+	37. 26
4. 24			160.12	

Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſima quarta.	Logarithmi cum differentiis.	Partes ſexagenaria.
4. 24			160.12	
38. 40. 57	62500. 00	15. 0. 0	47000.37—	37. 30
4. 25			159.88	
38. 45. 22	62600.00	15. 1. 26	46840.49+	37. 34
4. 25			159.61	
38.49.47	62700.00	15. 2. 53	46680.88—	37. 37
4. 24			159.37	
38. 54. 11	62800.00	15. 4. 19	46521.51+	37. 41
4. 25			159.11	
38. 58. 36	62900. 00	15. 5. 46	46362. 40+	37. 44
4. 25			158.85	
39. 3. 1	63000.00	15. 7. 12	46203.55	37. 48
4. 26			158.61	
39. 7. 27	63100. 00	15. 8. 38	46044.94+	37. 52
4. 27			158.35	
39. 11. 54	63200. 00	15. 10. 5	45886.59	37. 55
4. 27			158.10	
39. 16. 21	63300. 00	15. 11. 31	45728.49	37. 59
4. 27			157.86	
39.20.48	63400. 00	15. 12. 58	45570. 63+	38. 2
4. 26			157.60	
39. 25. 14	63500. 00	15. 14. 24	45413.03	38. 6
4. 27			157.36	
39. 29.41	63600. 00	15. 15. 50	45255.67+	38. 10
4. 27			157.10	
39. 34. 8	63700.00	15. 17. 17	45098. 57—	38. 13
4. 28			156.87	
39. 38. 36	63800. 00	15. 18. 43	44941. 70+	38. 17
4. 27			156.62	
39. 43. 3	63900.00	15. 20. 10	44785.08+	38. 20
4. 28			156.37	
39. 47. 31	64000.00	15. 21. 36	44628.71	38. 24
4. 28			156.12	
39. 51. 59	64100.00	15. 23. 2	44472.59—	38. 28
4. 29			155.89	
39.56. 28	64200.00	15.24. 29	44316.70	38. 31
4. 29			155.65	
40. 0. 57	64300.00	15. 25. 55	44161 05+	38. 35
4. 30			155.40	
40. 5. 27	64400.00	15. 27. 22	44005.65+	38. 38
4. 29			155.15	

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſima quarta.	Logarithmi cum differentiis.	Partes ſexagenaria.
4. 29			155.15	
40. 9. 56	64500.00	15.28.48	43850.50—	38. 42
4. 30			154.92	
40.14.26	64600.00	15. 30. 14	43695.58	38. 46
4. 30			154.68	
40. 18.56	64700.00	15. 31. 41	43540.90	38. 49
4. 31			154.44	
40.23. 27	64800.00	15. 33. 7	43386.46	38. 53
4. 31			154.20	
40.27.58	64900.00	15. 34. 34	43232.26	38. 56
4. 32			153.97	
40. 32. 30	65000.00	15. 36. 0	43078.29	39. 0
4. 32			153.73	
40. 37. 2	65100. 00	15. 37. 26	42924.56 +	39. 4
4. 33			153.48	
40. 41. 35	65200.00	15. 38. 53	42771.08	39. 7
4. 32			153.26	
40. 46. 7	65300. 00	15. 40.19	42617.82	39. 11
4. 33			153.03	
40.50.40	65400. 00	15. 41. 46	42464.79 +	39. 14
4. 33			152.79	
40. 55. 13	65500. 00	15. 43. 12	42312.00 +	39. 18
4. 33			152.55	
40.59.46	65600.00	15. 44. 38	42159.45	39. 22
4. 33			152.32	
41. 4. 19	65700.00	15. 46. 5	42007.13—	39. 25
4. 34			152.09	
41. 8. 53	65800.00	15. 47. 31	41855.04—	39. 29
4. 33			152.87	
41. 13. 26	65900. 00	15. 48. 58	41703.17 +	39. 32
4. 34			151.62	
41. 18. 0	66000.00	15. 50. 24	41551.55—	39. 36
4. 35			151.40	
41. 22. 35	66100. 00	15. 51. 50	41400.15—	39. 40
4. 35			151.18	
41.27.10	66200.00	15. 53. 17	41248.97 +	39. 43
4. 36			150.94	
41.31.46	66300.00	15. 54. 43	41098.03	39. 47
4. 35			150.72	
41. 36. 21	66400.00	15. 56. 10	40947.31 +	39. 50
4. 36			150.49	

ARCUS Circuli cum differentiis.	SINUS ſeu Numeri abſoluti.	*Partes viceſimæ quartæ.*	LOGARITHMI cum differentiis.	*Partes ſexagenariæ.*
4. 36			150.49	
41. 40. 57	66500. 00	15. 57. 36	40796. 82	39. 54
4. 36			150. 26	
41. 45. 33	66600. 00	15. 59. 2	40646. 56	39. 58
4. 37			150. 03	
41. 50. 10	66700. 00	16. 0. 29	40496. 53—	40. 1
4. 37			149. 82	
41. 54. 47	66800. 00	16. 1. 55	40346. 71 +	40. 5
4. 38			149. 58	
41. 59. 25	66900. 00	16. 3. 22	40197. 13—	40. 8
4. 37			149. 37	
42. 4. 2	67000. 00	16. 4. 48	40047. 76	40. 12
4. 38			149. 14	
42. 8. 40	67100. 00	16. 6. 14	39898. 62	40. 16
4. 38			148. 92	
42. 13. 18	67200. 00	16. 7. 41	39749. 70—	40. 19
4. 39			148. 70	
42. 17. 57	67300. 00	16. 9. 7	39601. 00—	40. 23
4. 39			148. 48	
42. 22. 36	67400. 00	16. 10. 34	39452. 52—	40. 26
4. 39			148. 26	
42. 27. 15	67500. 00	16. 12. 0	39304. 26	40. 30
4. 40			148. 04	
42. 31. 55	67600. 00	16. 13. 26	39156. 22	40. 34
4. 40			147. 76	
42. 36. 35	67700. 00	16. 14. 53	39008. 46	40. 37
4. 40			147. 66	
42. 41. 15	67800. 00	16. 16. 19	38860. 80	40. 41
4. 41			147. 38	
42. 45. 56	67900. 00	16. 17. 46	38713. 42—	40. 44
4. 41			147. 17	
42. 50. 37	68000. 00	16. 19. 12	38566. 25	40. 48
4. 42			146. 95	
42. 55. 19	68100. 00	16. 20. 38	38419. 30	40. 52
4. 42			146. 74	
43. 0. 1	68200. 00	16. 22. 5	38272. 56 +	40. 55
4. 43			146. 52	
43. 4. 44	68300. 00	16. 23. 31	38126. 64 +	40. 59
4. 42			146. 30	
43. 9. 26	68400. 00	16. 24. 58	37979. 74—	41. 2
4. 43			146. 09	

ARCUS

ARCUS Circuli cum differentiis.	SINUS ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	LOGARITHMI cum differentiis.	Partes ſexagenariæ.
4. 43			146.09	
43. 14. 9	68500. 00	16. 26. 24	37833. 65—	41. 6
4. 43			145. 88	
43. 18. 52	68600. 00	16. 27. 50	37687. 77—	41. 10
4. 43			145. 67	
43. 23. 35	68700. 00	16. 29. 17	37542. 10	41. 13
4. 44			145. 45	
43. 28. 19	68800. 00	16. 30. 43	37396. 65—	41. 17
4. 44			145. 25	
43. 33. 3	68900. 00	16. 32. 10	37251. 40 +	41. 20
4. 45			145. 03	
43. 37. 48	69000. 00	16. 33. 36	37106. 37	41. 24
4. 45			144. 83	
43. 42. 33	69100. 00	16. 35. 2	36961. 54 +	41. 28
4. 45			144. 61	
43. 47. 18	69200. 00	16. 36. 29	36816. 93	41. 31
4. 46			144. 40	
43. 52. 4	69300. 00	16. 37. 55	36672. 53—	41. 35
4. 46			144. 20	
43. 56. 50	69400. 00	16. 39. 22	36528. 33 +	41. 38
4. 47			143. 99	
43. 1. 37	69500. 00	16. 40. 48	36384. 34 +	41. 42
4. 47			143. 78	
44. 6. 24	69600. 00	16. 42. 14	36240. 56 +	41. 46
4. 48			143. 57	
44. 11. 12	69700. 00	16. 43. 41	36096. 99	41. 49
4. 48			143. 37	
44. 16. 0	69800. 00	16. 45. 7	35953. 62	41. 53
4. 48			143. 17	
44. 20. 48	69900. 00	16. 46. 34	35810. 45 +	41. 56
4. 49			142. 96	
44. 25. 37	70000. 00	16. 48. 0	35667. 49 +	42. 0
4. 49			142. 75	
44. 30. 26	70100. 00	16. 49. 26	35524. 74	42. 4
4. 50			142. 55	
44. 35. 15	70200. 00	16. 50. 53	35382. 19	42. 7
4. 50			142. 35	
44. 40. 5	70300. 00	16. 52. 19	35239. 84 +	42. 11
4. 50			142. 14	
44. 44. 55	70400. 00	16. 53. 46	35097. 70 —	42. 14
4. 51			141. 95	

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4. 51			141. 95	
44. 49. 46	70500. 00	16. 55. 12	34955. 75 —	42. 18
4. 51			141. 75	
44. 54. 37	70600. 00	16. 56. 38	34814. 00 +	42. 22
4. 52			141. 54	
44. 59. 29	70700. 00	16. 58. 5	34672. 46	42. 25
4. 52			141. 34	
45. 4. 21	70800. 00	16. 59. 31	34531. 12	42. 29
4. 52			141. 14	
45. 9. 13	70900. 00	17. 0. 58	34389. 98 —	42. 32
4. 53			140. 95	
45. 14. 6	71000. 00	17. 2. 24	34249. 03	42. 36
4. 53			140. 74	
45. 18. 59	71100. 00	17. 3. 50	34108. 29 —	42. 40
4. 54			140. 55	
45. 23. 53	71200. 00	17. 5. 17	33967. 74 —	42. 43
4. 54			140. 35	
45. 28. 47	71300. 00	17. 6. 43	33827. 39	42. 47
4. 54			140. 15	
45. 33. 41	71400. 00	17. 8. 10	33687. 24 —	42. 50
4. 55			139. 96	
45. 38. 36	71500. 00	17. 9. 36	33547. 28 —	42. 54
4. 55			139. 77	
45. 43. 31	71600. 00	17. 11. 2	33407. 51	42. 58
4. 56			139. 57	
45. 48. 27	71700. 00	17. 12. 29	33267. 94 +	43. 1
4. 56			139 37	
45. 53. 23	71800. 00	17. 13. 55	33128. 57	43. 5
4. 57			139. 18	
45. 58. 20	71900. 00	17. 15. 22	32989. 39	43. 8
4. 57			138. 98	
46. 3. 17	72000. 00	17. 16. 48	32850. 41 —	43. 12
4. 58			138. 79	
46. 8. 15	72100. 00	17. 18. 14	32711. 62 —	43. 16
4. 58			138. 60	
46. 13. 13	72200. 00	17. 19. 41	32573. 02 —	43. 19
4. 59			138. 41	
46. 18. 12	72300. 00	17. 21. 7	32434. 61 —	43. 23
4. 59			138. 22	
46. 23. 11	72400. 00	17. 22. 34	32296. 39	43. 26
4. 59			138. 03	

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4. 59			138.03	
46.28.10	72500.00	17.24.0	32158.36+	43.30
5. 0			137.83	
46.33.10	72600.00	17.25.26	32020.53	43.34
5. 0			137.65	
46.38.10	72700.00	17.26.53	31882.88	43.37
5. 1			137.46	
46.43.11	72800.00	17.28.19	31745.42+	43.41
5. 1			137.27	
46.48.12	72900.00	17.29.46	31608.15+	43.44
5. 1			137.07	
46.53.13	73000.00	17.31.12	31471.08−	43.48
5. 2			136.90	
46.58.15	73100.00	17.32.38	31334.18	43.52
5. 2			136.70	
47.3.17	73200.00	17.34.5	31197.48−	43.55
5. 3			136.53	
47.8.20	73300.00	17.35.31	31060.95	43.59
5. 3			136.33	
47.13.23	73400.00	17.36.58	30924.62	44.2
5. 4			136.14	
47.18.27	73500.00	17.38.24	30788.48	44.6
5. 5			135.96	
47.23.32	73600.00	17.39.50	30652.52	44.10
5. 5			135.78	
47.18.37	73700.00	17.41.17	30516.74	44.13
5. 6			135.60	
47.33.43	73800.00	17.42.43	30381.14+	44.17
5. 6			135.40	
47.38.49	73900.00	17.44.10	30245.74−	44.20
5. 7			135.23	
47.43.56	74000.00	17.45.36	30110.51	44.24
5. 7			135.04	
47.49.3	74100.00	17.47.2	29975.47	44.28
5. 7			134.86	
47.54.10	74200.00	17.48.29	29840.61−	44.31
5. 8			134.68	
47.59.18	74300.00	17.49.55	29705.93	44.35
5. 8			134.50	
48.4.26	74400.00	17.51.22	29571.43	44.38
5. 9			134.32	

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5. 9			134.32	
48. 9. 35	74500.00	17. 52. 48	29437.11	44.42
5. 9			134.14	
48. 14. 44	74600.00	17. 54. 14	29302.97	44.46
5. 10			133.96	
48. 19. 54	74700.00	17. 55. 41	29169.01	44.49
5. 10			133.78	
48. 25. 4	74800.00	17. 57. 7	29035.23	44. 53
5. 11			133.60	
48. 30. 15	74900.00	17. 58. 34	28901.63	44. 56
5. 11			133.42	
48. 35. 26	75000.00	18. 0. 0	28768.21—	45. 0
5. 12			133.25	
48. 40. 38	75100.00	18. 1. 26	28634.96 +	45. 4
5. 13			133.06	
48. 45. 51	75200.00	18. 2. 53	28501.90	45. 7
5. 13			132.90	
48. 51. 4	75300.00	18. 4. 19	28369.00 +	45. 11
5. 14			132.71	
48. 56. 18	75400.00	18. 5. 46	28236.29	45. 14
5. 14			132.54	
49. 1. 32	75500.00	18. 7. 12	28103.75 +	45. 18
5. 15			132.36	
49. 6. 47	75600.00	18. 8. 38	27971.39	45. 22
5. 15			132.19	
49. 12. 2	75700.00	18. 10. 5	27839.20 +	45. 25
5. 16			132.01	
49. 17. 18	75800.00	18. 11. 31	27707.19	45.29
5. 16			131.84	
49. 22. 34	75900.00	18. 12. 58	27575.35 +	45. 32
5. 17			131.66	
49. 27. 51	76000.00	18 14. 24	27443.69—	45. 36
5. 18			131.50	
49. 33. 9	76100.00	18. 15. 50	27312.19	45.40
5. 18			131.32	
49. 38. 27	76200.00	18. 17. 17	27180.87 +	45. 43
5. 19			131.14	
49. 43. 46	76300.00	18. 18. 43	27049.73—	45. 47
5. 19			130.98	
49. 49. 5	76400.00	18. 20. 10	26918.75	45. 50
5. 20			130.81	

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
5. 20			130.81	
49. 54. 25	76500.00	18. 21. 36	26787.94 +	45. 54
5. 21			130.63	
49. 59. 46	76600.00	18. 23. 2	26657.31	45. 58
5. 21			130.46	
50. 5. 7	76700.00	18. 24. 29	26526.85	46. 1
5. 22			130.29	
50. 10. 29	76800.00	18. 25. 55	26396.56 −	46. 5
5. 22			130.13	
50. 15. 51	76900.00	18. 27. 22	26266.43 +	46. 8
5. 23			129.95	
50. 21. 14	77000.00	18. 28. 48	26136.48	46. 12
5. 24			129.79	
50. 26. 38	77100.00	18. 30. 14	26006.69 +	46. 16
5. 24			129.62	
50. 32. 2	77200.00	18. 31. 41	25877.07 +	46. 19
5. 25			129.45	
50. 37 27	77300.00	18. 33. 7	25747.62 +	46. 23
5. 26			129.28	
50. 42. 53	77400.00	18. 34. 34	25618.34	46. 26
5. 26			129.11	
50. 48. 19	77500.00	18. 36. 0	25489.23 −	46. 30
5. 27			128.95	
50. 53. 46	77600.00	18. 37. 26	25360.28 −	46. 34
5. 27			128.79	
50. 59. 13	77700.00	18. 38. 35	25231.49 +	46. 37
5. 28			128.61	
51. 4. 41	77800.00	18. 40. 19	25102.88	46. 41
5. 28			128.46	
51. 10. 9	77900 00	18. 41. 46	24974. 42 +	46. 44
5. 29			128.29	
51. 15. 38	78000.00	18. 43. 12	24846. 13 +	46. 48
5. 30			128.12	
51. 21. 8	78100.00	18. 44. 38	24718.01 +	46. 52
5. 31			127.95	
51. 26. 39	78200.00	18. 46. 5	24590.06 −	46. 55
5. 31			127.80	
51. 32. 10	78300.00	18. 47. 31	24462.26 −	46. 59
5. 32			127.63	
51. 37. 42	78400.00	18. 48. 58	24334.63 −	47. 2
5. 33			127. 47	

Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſima quarta.	Logarithmi cum differentiis.	Partes ſexagenaria.
5. 33			127.47	
51. 43. 15	78500. 00	18. 50. 24	24207.16	47. 6
5. 33			127.31	
51. 48. 48	78600. 00	18. 51. 50	24079.85	47. 10
5. 34			127.15	
51. 54. 22	78700. 00	18. 53. 17	23952.70 +	47. 13
5. 34			126.98	
51. 59. 56	78800. 00	18. 54. 43	23825.72	47. 17
5. 35			126.82	
52. 5. 31	78900. 00	18. 56. 10	23698.90 —	47. 20
5. 36			126.67	
52. 11. 7	79000. 00	18. 57. 36	23572. 23 +	47. 24
5. 37			126.50	
52. 16. 44	79100. 00	18. 59. 2	23445. 73	47. 28
5. 38			126.34	
52. 22. 22	79200. 00	19. 0. 29	23319. 39 —	47. 31
5. 38			126.19	
52. 28. 0	79300. 00	19. 1. 55	23193. 20 +	47. 35
5. 39			126.02	
52. 33. 39	79400. 00	19. 3. 22	23067. 18	47. 38
5. 40			125.86	
52. 39. 19	79500. 00	19. 4. 48	22941. 32	47. 42
5. 41			125.71	
52. 45 0	79600. 00	19. 6. 14	22815. 61	47. 46
5. 41			125.55	
52. 50. 41	79700. 00	19. 7. 41	22690. 06	47. 49
5. 42			125.36	
52. 56. 23	79800. 00	19. 9. 7	22564. 67	47. 53
5. 42			125.24	
53. 2. 5	79900. 00	19. 10. 34	22439. 43 +	47. 56
5. 43			125.07	
53. 7. 48	80000. 00	19. 12. 0	22314. 36 —	48. 0
5. 44			124.93	
53. 13. 32	80100. 00	19. 13. 26	22189. 43 +	48. 4
5. 45			124.76	
53. 19. 17	80200. 00	19. 14. 53	22064. 67	48. 7
5. 46			124.61	
53. 25. 3	80300. 00	19. 16. 19	21940. 06	48. 11
5. 46			124.46	
53. 30. 49	80400. 00	19. 17. 46	21815. 60 +	48. 14
5. 47			124.30	

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſima quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
5. 47			124.30	
53. 36. 36	80500. 00	19. 19. 12	21691.30	48. 18
5. 48			124.15	
53. 42. 24	80600.00	19. 20. 38	21567. 15	48. 22
5. 49			123.98	
53. 84. 13	80700.00	19. 22. 5	21443.17—	48. 25
5. 50			123. 85	
53. 54. 3	80800.00	19. 23. 31	21319. 32 +	48. 29
5. 51			123.68	
53. 59. 54	80900.00	19. 24. 58	21195.64—	48. 32
5. 52			123. 54	
54. 5. 46	81000.00	19. 26. 24	21072.10 +	48. 36
5. 52			123.38	
34. 11. 38	81100. 00	19. 27. 50	20948.72 +	48. 40
5. 53			123.23	
34. 17. 31	81200. 00	19. 29. 17	20825.49 +	48. 43
5. 54			123.07	
54. 23. 25	81300. 00	19. 30. 43	20702.42	48. 47
5. 55			122.93	
54. 29. 20	81400. 00	19. 32. 10	20579.49 +	48. 50
5. 56			122.77	
54. 35. 16	81500. 00	19. 33. 36	20456.72—	48. 54
5. 57			122.63	
54. 41. 13	81600. 00	19. 35. 2	20334.09 +	48. 58
5. 58			122.47	
54. 47. 11	81700. 00	19. 36. 29	20211. 62—	49. 1
5. 58			122.32	
54. 53. 9	81800. 00	19. 37. 55	20089.30—	49. 5
5. 59			122.18	
54. 59. 8	81900. 00	19. 39. 22	19967. 12	49. 8
6. 0			122.03	
55. 5. 8	82000.00	19. 40. 48	19845.09 +	49. 12
6. 1			121.87	
55. 11. 9	82100. 00	19. 42. 14	19723.22—	49. 16
6. 2			121.73	
55. 17. 11	82200. 00	19. 43. 41	19601.49	49. 19
6. 3			121.58	
55. 23. 14	82300. 00	19. 45. 7	19479.91	49. 23
6. 3			121.43	
55. 29. 17	82400.00	19. 46. 34	19358.48	49. 26
6. 4			121.29	

Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
6. 4			121.29	
55. 35. 21	82500. 00	19. 48. 0	19237. 19	49. 30
6. 5			121. 14	
55. 41. 26	82600. 00	19. 49. 26	19116. 05	49. 34
6. 6			120. 99	
55. 47. 32	82700. 00	19. 50. 53	18995. 06	49. 37
6. 7			120. 84	
55. 53. 39	82800. 00	19. 52. 19	18874. 22—	49. 41
6. 8			120. 71	
55. 59. 47	82900. 00	19. 53. 46	18753. 51 +	49. 44
6. 9			120. 55	
56. 5. 56	83000. 00	19. 55. 12	18632. 96	49. 48
6. 10			120. 41	
56. 12. 6	83100. 00	19. 56. 38	18512. 55	49. 52
6. 11			120. 27	
56. 18. 17	83200. 00	19. 58. 5	18392. 28 +	49. 55
6. 12			120. 12	
56. 24. 29	83300. 00	19. 59. 31	18272. 16 +	49. 59
6. 13			119. 97	
56. 30. 42	83400. 00	20. 0. 58	18152. 19	50. 2
6. 14			119. 83	
56. 36. 56	83500. 00	20. 2. 24	18032. 36	50. 6
6. 15			119. 69	
56. 43. 11	83600. 00	20. 3. 50	17912. 67—	50. 10
6. 16			119. 55	
56. 49. 27	83700. 00	20. 5. 17	17793. 12	50. 13
6. 18			119. 40	
56. 55. 45	83800. 00	20. 6. 43	17673. 72—	50. 17
6. 19			119. 26	
57. 2. 4	83900. 00	20. 8. 10	17554. 46 —	50. 20
6. 20			119. 12	
57. 8. 24	84000. 00	20. 9. 36	17435. 34	50. 24
6. 21			118. 98	
57. 14. 45	84100. 00	20. 11. 2	17316. 36 +	50. 28
6. 22			118. 83	
57. 21. 7	84200. 00	20. 12. 29	17197. 53 —	50. 31
6. 23			118. 70	
57. 27. 30	84300. 00	20. 13. 55	17078. 83	50. 35
6. 24			118. 55	
57. 33. 54	84400. 00	20. 15. 22	16960. 28—	50. 38
6. 25			118. 41	

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Arcus Circuli cum differentiis.		Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.		Partes ſexagenariæ.
	6.25				118.41	
57.40.19	6.26	84500.00	20.16.48	16841.87−	118.28	50.42
57.46.45	6.27	84600.00	20.18.14	16723.59+	118.13	50.46
57.53.12	6.28	84700.00	20.19.41	16605.46	117.99	50.49
57.59.40	6.30	84800.00	20.21.7	16487.47−	117.86	50.53
58.6.10	6.31	84900.00	20.22.34	16369.61+	117.71	50.56
58.12.41	6.32	85000.00	20.24.0	16251.90+	117.58	51.0
58.19.13	6.33	85100.00	20.25.26	16134.32	117.44	51.4
58.25.46	6.35	85200.00	20.26.53	16016.88−	117.31	51.7
58.32.21	6.36	85300.00	20.28.19	15899.57+	117.16	51.11
58.38.57	6.37	85400.00	20.29.46	15782.41	117.03	51.14
58.45.34	6.39	85500.00	20.31.12	15665.38	116.89	51.18
58.52.13	6.40	85600.00	20.32.38	15548.49+	116.75	51.22
58.58.53	6.41	85700.00	20.34.5	15431.74	116.62	51.25
59.5.34	6.42	85800.00	20.35.31	15315.12	116.48	51.29
59.12.16	6.44	85900.00	20.36.58	15198.64−	116.35	51.32
59.19.0	6.45	86000.00	20.38.24	15082.29	116.21	51.36
59.25.45	6.46	86100.00	20.39.50	14966.08−	116.06	51.40
59.32.31	6.47	86200.00	20.41.17	14850.02−	115.95	51.43
59.39.18	6.49	86300.00	20.42.43	14734.07+	115.82	51.47
59.46.7	6.51	86400.00	20.44.10	14618.25+	115.68	51.50

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
6. 51			115.68	
59. 52. 58	86500. 00	20. 45.36	14502.57	51. 54
6. 52			115.53	
59.59.50	86600.00	20. 47. 2	14387.04−	51. 58
6. 53			115.41	
60. 6. 43	86700.00	20.48.29	14271.63	52. 1
6. 54			115.27	
60. 13.37	86800. 00	20. 49.55	14156.36	52. 5
6. 56			115.14	
60.20.33	86900.00	20. 51. 22	14041. 22	52. 8
6. 57			115.01	
60. 27.30	87000.00	20.52.48	13926.21−	52. 12
6. 59			114.88	
60.34.29	87100. 00	20.54.14	13811.33	52. 16
7. 1			114.74	
60. 41.30	87200.00	20. 55. 41	13696.59	52. 19
7. 3			114.72	
60.48. 33	87300.00	20. 57. 7	13581.87	52. 23
7. 4			114.38	
60. 55. 37	87400.00	20. 58.34	13467.49+	52. 26
7. 6			114.35	
61. 2. 43	87500.00	21. 0. 0	13353. 14	52. 30
7. 8			114.22	
61. 9. 51	87600.00	21. 1. 26	13238.92	52. 34
7. 9			114.09	
61. 17. 0	87700.00	21. 2. 53	13124.83+	52. 37
7. 10			113.96	
61.24. 10	87800. 00	21. 4. 19	13010.87	52. 41
7. 12			113.83	
61. 31. 22	87900. 00	21. 5. 46	12897.04	52. 44
7. 13			113.70	
61. 38. 35	88000. 00	21. 7. 12	12783.34−	52. 48
7. 15			113. 57	
61. 45. 50	88100. 00	21. 8. 38	12669.77−	52. 52
7. 16			113.45	
61. 53. 6	88200. 00	21. 10. 5	12556.32	52. 55
7. 18			113.31	
62. 0. 24	88300. 00	21. 11. 31	12443.01−	52. 59
7. 20			113.19	
62. 7 44	88400.00	21. 12. 58	12329.82	53. 2
7. 22			113.06	

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
7. 22			113.06	
62. 15. 6	88500. 00	21. 14. 24	12216. 76 +	53. 6
7. 24			112. 93	
62. 22. 30	88600. 00	21. 15. 50	12103. 83 +	53. 10
7. 26			112. 80	
62. 29. 56	88700. 00	21. 17. 17	11991. 03	53. 13
7. 27			112. 68	
62. 37. 23	88800. 00	21. 18. 43	11878. 35 +	53. 17
7. 29			112. 55	
62. 44. 52	88900. 00	21. 20. 10	11765. 80 +	53. 20
7. 31			112. 42	
62. 53. 23	89000. 00	21. 21. 36	11653. 38	53. 24
7. 33			112. 29	
62. 59. 56	89100. 00	21. 23. 2	11541. 09 —	53 28
7. 35			112. 17	
63. 7. 31	89200. 00	21. 24. 29	11428. 92 —	53. 31
7. 37			112. 05	
63. 15. 8	89300. 00	21. 25. 55	11316. 87	53. 35
7. 40			111. 92	
63. 22. 48	89400. 00	21. 27. 22	11204. 95	53. 38
7. 42			111. 79	
63. 30. 30	89500. 00	21. 28. 48	11093. 16 —	53. 42
7. 44			111. 67	
63. 38. 14	89600. 00	21. 30. 14	10981. 49	53. 46
7. 46			111. 55	
63. 46. 0	89700. 00	21. 31. 41	10869. 94 +	53. 49
7. 48			111. 42	
63. 53. 48	89800. 00	21. 33. 7	10758. 52	53. 53
7. 50			111. 29	
64. 1. 38	89900. 00	21. 34. 34	10647. 23 —	53 56
7. 52			111. 18	
64. 9. 30	90000. 00	21. 36. 0	10536. 05	54. 0
7. 54			111. 05	
64. 17. 24	90100. 00	21. 37. 26	10425. 00	54. 4
7. 56			110. 92	
64. 25. 20	90200. 00	21. 38. 53	10314. 08 —	54. 7
7. 58			110. 81	
64. 33. 18	90300. 00	21. 40. 19	10203. 27 +	54. 11
8. 1			110. 68	
64. 41. 19	90400. 00	21. 41. 46	10092. 59	54 14
8. 3			110. 56	

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
8. 3			110.56	
64.49.22	90500. 00	21. 43. 12	9982. 03 +	54. 18
8. 6			110.43	
64.57.28	90600. 00	21. 44. 38	9871. 60	54. 22
8. 9			110.32	
65. 5. 37	90700.00	21. 46. 5	9761. 28 +	54. 25
8. 12			110. 19	
65.13.49	90800. 00	21. 47. 31	9651. 09	54. 29
8. 14			110.07	
65. 22. 3	90900. 00	21. 48. 58	9541. 02	54. 32
8. 17			109.95	
65. 30. 20	91000. 00	21. 50. 24	9431. 07	54. 36
8. 19			109. 83	
65. 38. 39	91100. 00	21. 51. 50	9321. 24	54. 40
8. 21			109.71	
65. 47. 0	91200. 00	21. 53. 17	9211. 53	54. 43
8. 24			109.59	
65. 55. 24	91300. 00	21. 54. 43	9101. 94	54. 47
8. 26			109.47	
66. 3. 50	91400. 00	21. 56. 10	8992.47	54. 50
8. 29			109. 35	
66.12. 19	91500. 00	21. 57. 36	8883. 12 +	54. 54
8. 32			109.23	
66.29. 51	91600. 00	21. 59. 2	8773. 89 +	54. 58
8. 35			109.11	
66.29.26	91700. 00	22. 0. 29	8664. 78	55. 1
8. 39			108 99	
66. 38. 5	91800. 00	22. 1. 55	8555. 79	55. 5
8. 42			108.87	
66.46.47	91900. 00	22. 3. 22	8446.92 —	55. 8
8. 46			108.76	
66. 55. 33	92000. 00	22. 4. 48	8338. 16	55. 12
8. 49			108.63	
67. 4. 22	92100. 00	22. 6. 14	8229.53 —	55. 16
8. 51			108.52	
67. 13. 13	92200. 00	22. 7. 41	8121. 01 —	55. 19
8. 54			108.40	
67. 22. 7	92300. 00	22. 9. 7	8012.61 —	55. 23
8. 58			108.29	
67. 31. 5	92400. 00	22.10. 34	7904.32	55. 26
9. 1			108.16	

Arcus

Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
9. 1			108.16	
67. 40. 6	92500. 00	22. 12. 0	7796.16—	55. 30
9. 4			108.05	
67. 49. 10	92600.00	22. 13. 26	7688.11 —	55. 34
9. 8			107.94	
67. 58. 18	92700.00	22. 14. 53	7580.17 +	55. 37
9. 13			107.81	
68. 7. 31	92800.00	22. 16. 19	7472.36 +	55. 41
9. 15			107.70	
68. 16. 46	92900. 00	22. 17. 46	7364.66—	55. 44
9. 20			107.59	
68. 26. 6	93000.00	22. 19. 12	7257.07	55. 48
9. 23			107.47	
68. 35. 29	93100. 00	22. 20. 38	7149.60	55. 52
9. 27			107.35	
68. 44. 56	93200. 00	22. 22. 5	7042.25	55. 55
9. 31			107.24	
68. 54. 27	93300. 00	22. 23. 31	6935.01	55. 59
9. 35			107.12	
69. 4. 2	93400. 00	22. 24. 58	6827.89—	56. 2
9. 39			107.01	
69. 13. 41	93500. 00	22. 26. 24	6720.88—	56. 6
9. 44			106.90	
69. 23. 25	93600. 00	22. 27. 50	6613.98	56. 10
9. 48			106.78	
69. 33. 13	93700.00	22. 29. 17	6507.20	56. 13
9. 53			106.67	
69. 43. 6	93800.00	22. 30. 43	6400.53 +	56. 17
9. 57			106.55	
69. 53. 3	93900.00	22. 32. 10	6293.98	56. 20
10. 3			106.44	
70. 3. 6	94000.00	22. 33. 36	6187.54	56. 24
10. 7			106.32	
70. 13. 13	94100.00	22. 35. 2	6081.22—	56. 28
10. 12			106.22	
70. 23. 25	94200.00	22. 36. 29	5975.00	56. 31
10. 17			106.10	
70. 33. 42	94300.00	22. 37. 55	5868.90	56. 35
10. 22			105.99	
70. 44. 4	94400.00	22. 39. 22	5762.91	56. 38
10. 27			105.87	

ARCUS *Circuli cum differentiis.*	SINUS *ſeu Numeri abſoluti.*	*Partes viceſimæ quartæ.*	LOGARITHMI *cum differentiis.*	*Partes ſexagenariæ.*
10.27			105.87	
70.54.31	94500.00	22.40.48	5657.04—	56.42
10.34			105.77	
71.5.5	94600.00	22.42.14	5551.27	56.46
10.39			105.65	
71.15.44	94700.00	22.43.41	5445.62	56.49
10.46			105.54	
71.26.30	94800.00	22.45.7	5340.08	56.53
10.51			105.43	
71.37.21	94900.00	22.46.34	5234.65	56.56
10.57			105.32	
71.48.18	95000.00	22.48.0	5129.33	57.0
11.4			105.21	
71.59.22	95100.00	22.49.26	5024.12	57.4
11.12			105.09	
72.10.34	95200.00	22.50.53	4919.03—	57.7
11.18			104.99	
72.21.52	95300.00	22.52.19	4814.04	57.11
11.24			104.88	
72.33.16	95400.00	22.53.46	4709.16	57.14
11.31			104.77	
72.44.47	95500.00	22.55.12	4604.39+	57.18
11.39			104.65	
72.56.26	95600.00	22.56.38	4499.74—	57.22
11.47			104.55	
73.8.13	95700.00	22.58.5	4395.19	57.25
11.54			104.44	
73.20.7	95800.00	22.59.31	4290.75	57.29
12.3			104.33	
73.32.10	95900.00	23.0.58	4186.42	57.32
12.12			104.22	
73.44.22	96000.00	23.2.24	4082.20	57.36
12.23			104.11	
73.56.45	96100.00	23.3.50	3978.09	57.40
12.30			104.01	
74.9.15	96200.00	23.5.17	3874.08+	57.43
12.40			103.89	
74.21.55	96300.00	23.6.43	3770.79—	57.47
12.50			103.79	
74.34.45	96400.00	23.8.10	3666.40	57.50
13.0			103.68	

ARCUS

Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
13. 0			103.68	
74.47.45	96500.00	23. 9. 36	3562.72	57. 54
13. 12			103.57	
75. 0. 57	96600.00	23. 11. 2	3459.15−	57. 58
13. 25			103.47	
75. 14. 22	96700.00	23. 12. 29	3355.68	58. 1
13. 38			103.36	
75. 28. 0	96800.00	23. 13. 55	3252.32	58. 5
13. 50			103.25	
75. 41. 50	96900.00	23. 15. 22	3149.07−	58. 8
14. 3			103.15	
75. 55. 53	97000.00	23. 16. 48	3045.92	58. 12
14. 16			103.04	
76. 10. 9	97100.00	23. 18. 14	2942.88	58. 16
14. 30			102.93	
76.24.39	97200.00	23. 19. 41	2839.95	58. 19
14. 45			102.83	
76.39.24	97300.00	23. 21. 7	2737.12	58. 23
15. 1			102.72	
76. 54. 25	97400.00	23. 22. 34	2634.40	58. 26
15. 18			102.62	
77. 9. 43	97500.00	23. 24. 0	2531.78	58. 30
15. 37			102.51	
77.25.20	97600.00	23. 25. 26	2429.27	58. 34
15. 55			102.41	
77. 41.15	97700.00	23. 26. 53	2326.86+	58. 37
16. 17			102.30	
77.57.32	97800.00	23. 28. 19	2224.56	58. 41
16.40			102.20	
78. 14. 12	97900.00	23. 29.46	2122.36+	58. 44
17. 5			102.09	
78. 31.17	98000.00	23. 31. 12	2020.27	58. 48
17. 31			101.99	
78.48.48	98100.00	23. 32. 38	1918.28	58. 52
17. 59			101.88	
79. 6. 47	98200.00	23. 34. 5	1816.40−	58. 55
18. 27			101.78	
79. 25.14	98300.00	23. 35. 31	1714.62−	58. 59
18. 58			101.68	
79.44.12	98400.00	23. 36. 58	1612.94	59. 2
19. 34			101.58	

Arcus

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Arcus Circuli cum differentiis.	Sinus ſeu Numeri abſoluti.	Partes viceſimæ quartæ.	Logarithmi cum differentiis.	Partes ſexagenariæ.
19. 34			101.58	
80. 3. 46	98500. 00	23. 38. 24	1511.36 +	59. 6
20. 12			101.47	
80. 23. 58	98600.00	23. 39. 50	1409.89 +	59. 10
20. 53			101.37	
80. 44. 51	98700.00	23. 41. 17	1308. 52 +	59. 13
21. 42			101.26	
81. 6. 33	98800.00	23. 42. 43	1207.26	59. 17
22. 53			101.17	
81. 29.26	98900.00	23. 44.10	1106.09 +	59. 20
24. 6			101.06	
81. 53. 32	99000.00	23. 45. 36	1005.03 +	59. 24
25. 6			100.96	
82. 18.38	99100. 00	23. 47. 2	904.07 +	59. 28
26. 28			100.85	
82. 45. 6	99200.00	23.48.29	803. 22 +	59. 31
27. 54			100.76	
83. 13 0	99300.00	23. 49. 55	702. 46	59. 35
30. 20			100.65	
83. 43. 20	99400.00	23. 51. 22	601. 81	59. 38
32. 40			100.56	
84. 16. 0	99500. 00	23. 52. 48	501. 25 +	59. 42
36. 30			100.45	
84. 52.30	99600.00	23. 54. 14	400.80	59. 46
41. 9			100.35	
85. 33. 39	99700.00	23. 55. 41	300. 45	59. 49
48. 54			100.25	
86. 22. 33	99800.00	23. 57. 7	200.20	59. 53
1. 3. 42			100.15	
87. 26. 15	99900 00	23. 58. 34	100. 05	59. 56
2. 33. 45			100.05	
90. 0. 0	100000.00	24. 0. 0	000000. 00	60. 0

Errata. *Tabella quæ pertinet ad Poſtul.2.lin.4.lege* 1073741824.*Ibid.in tit. primæ columnæ lege proportionalis.Ib.verba in marg.Quindecim quartæ pertinet ad Quartas,non quintas* 1.*columnæ.Ibid.ſub ult.col.lege hic numerus unitate ſuperat.Ibid.ad marg.dextr.lin.9.ante altera interponantur hæc verba: rurſumq; erunt partes inter ſe æquales,una inter* 100.*&c. &* $91\frac{1}{2}$ *&c.Ibi.col.3.in l.pen.tabulæ lege* 00265. *Ib.col. ult.l.10.tabellæ lege* 4194304.*In Canone lit.H.col.1.in log.l.19.lege* 1392087.*Item col. 4.ſub tit.arcus,l.16.lege* 3. 26.*Ibid.ſub tit.part.viceſ.4tæ,l.4.lege* 0.37.26. *col.5. H.ſub tit.part.ſexag.l.6. lege* 2.49.*col.7.H.log.lege* 232278.*col.8.H. tit.arc.l.31.lege* 6.46. 36. *col.4.I.lin.à fine 4.in log.lege* 159454.93.*col.5.I.ſub tit.arcus lin.21.lege* 12.17.53.*& pro ſeq.lege* 12.21.24.*col.6.I.tit.Log.lin.11.lege* 437.64.

FINIS.

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Joannis Kepleri,

IMP. CÆS. FERDINANDI II.
MATHEMATICI,

SUPPLEMENTUM CHILIADIS LOGARITHMORUM,

Continens

PRÆCEPTA DE EORUM USU,

AD

ILLUSTRISS. PRINCIPEM ET DOMINUM,

DN. PHILIPPUM LAND-GRAVIUM HASSIÆ, &c.

MARPURGI,

Ex officina Typographica Caſparis Chemlini.

cIɔ Iɔ cXXV.

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JOANNIS KEPLERI

SUPPLEMENTUM CHILIADIS LOGARITHMORUM,

Continens

PRÆCEPTA DE EORUM USU.

LECTORI S.

C*VM anno* 1621. *veniſſem in Germaniam ſuperiorem, paſſimq; cum peritis rerum Mathematicarum de Logarithmis Neperianis contuliſſem: deprehendi eos, quibus ætas prudentiam addebat, promptitudinem minuebat, ſuper hoc genere numerorum, loco Canonis Sinuum in uſum recipiendo, cunctari: quod dicerent turpe eſſe Profeſſori Mathematico, ſuper compendio aliquo calculi pueriliter exultare, interimq; ſine demonſtratione legitimâ formam calculi in uſum recipere, quæ olim, cùm minimè metueres, in erroris inſidias te pertrahere poſſet. Querebantur Neperi demonſtrationem niti figmento motus cujuſdam Geometrici; cujus lubricitas & fluxibilitas inepta eſſet, in quâ ſolidus ille ſtilus Rationis Demonſtrationumq; firmum poneret veſtigium. Hæc mihi cauſa fuit, ſtatim tunc concipiendi rudimentum aliquod Demonſtrationis legitimæ; quod poſterius, ut primùm Lincium reverſus ſum, excolui diligentius: maximè poſtquàm initio anni* 1622. *ſupra ea re cum Illuſtri & Generoſo D. D. Petro Henrico à Stralendorff, S. Cæſ.*

Majeſt. in conſiſtorio Imperiali Aulico, vice Præſide, &c. contuliſſem; qui ut eſt harum artium avidiſſimus, rogando plurium me rerum admonuit, quàm liber aliquis benè craſſus præcipiendo admonere poſſet. Per illam igitur hyemem ſolennem rei demonſtrationem ſum aggreſſus; ſubjectum hujus ſpeculationis, quodnam eſſet genuinum, deſcripſi; quodq; id non eſſet verè ſub genere vel linearum, vel motus fluxusq;, aut cujuſquàm alterius quantitatis ſenſilis, ut ſic dicam, ſed ſub genere Relationum, *quantitatisq; mentalis, evidentibus enunciationibus conſtitui: deinde, cùm, ut omnes cæteræ, ſic etiam mentalis iſta quantiatas (λόγος Græcis dicta, quod Latini Rationem minus uſitatè, crebrius Proportionem transferunt) diviſionem in infinitum recipiat: metas etiam hujus diviſionis congruas, ex eodem ſcilicet genere rerum conſtitui: Linea enim punctis, motus articulis temporum dividi ſolet; at Proportionem diſpeſcunt termini inter extremos magnitudine medii. Hiſce ſic conſtitutis feliciter, procedebat demonſtratio: vera proportionum omnium communicantium communisq; menſura, facta eſt & ipſa de genere proportionum: locus eſt factus Arbitrio, in eligendo proportionis Elemento, quodnam deberet haberi pro minimo, proq; menſura: demonſtratum etiam eſt plerunq; eſſe proportiones inter ſe incommunicabiles; eoq; minimum unius Elementum quod placuiſſet, non poſſe eſſe menſuram genuinam proportionis cujuſcunq; alterius: ſemper enim peccari vel exceſſu, vel defectu. Ea de cauſa factus jam eſt hic alter locus Arbitrio, ut quinam defectus, quæ minimorum Elementorum incommunicabilium differentia diſſimulari poſſet, inq; profundum inſenſibilitatis demergi, conſtitueretur; ut ſic tandem in uſum ipſum numerorum redundaret, abſurda quidem demonſtranti, ſed utiliſſima computanti,* incommunicabilium proportionum communis menſura, Logarithmus dicta.

Simul autem fuit ipſo opere monendus Lector meus, Logarithmos non primum naſci cum Sinubus, ſeu rectis in Circulo, quod Neperiana deſcriptio incautius inſpecta præ ſe ferre videtur, ſed foris extra Geometriam Circuli conſtitui, tanquam intra metas libri Quinti Euclidis: inde verò tranſſumptos, applicari Sinubus; Eoq; concipiendam eſſe animo (quam ipſe dudum deſcripſeram in Tabula.) Matricem quandam Logarithmorum, ex qua omnis per numeros expreſſa quantitas, etiam Sinus ipſi, ſuos Logarithmos peterent, ea ipſa numerorum fide, quâ Sinus ipſi ſunt in Geometria Circuli definiti: ut ſi qui Sinus non legitimo numero ſit expreſſus, idem etiam ex hac Matrice Logarithmum imperfectum hauſurus ſit, nullo Matricis, ſed ſuo proprio vitio. Hoc igitur propoſito & computata eſt à me Chilias Logarithmorum, & adornata etiam demonſtra-

tio;

tio; quæ Ordinem præcipuè numerorum Chiliadis eſt complexa, cauſaſq; ejus in lucem profert. De uſu Chiliadis populari cogitatio æqualis quidem tempore, naturâ tamen fuit poſterior. Chiliada cum demonſtratione, ut primùm perfecta fuit, tranſmiſi Lincio tanquam ad PHILIPPUM LANDGRAVIUM HASSIÆ, *ſed per ambages itinerum, in quibus libellus hæſit in tertium annum uſq;. Spes interdum affulſit mihi, libellum excuſum iri curâ peritorum: ſed ea ſubinde iterum extincta fuit. Itaq; refrixit etiam apud me ſtudium libelli exornandi. Tandem in manus Patroni ſui Illuſtriſſimi perlatus, me penitus ignaro, nec quicquam tale opinante, typis mandatus fuit; ut prius ex Catalogo Nundinarum Francofurtenſium, quàm ex Literis Celſ. ſuæ (quas adhucdum in itinere eſſe nuper admodum reſcivi) quid ageretur perceperim. Non dubito, quin Celſ. ſua in literis me moneat, ſi quid de uſu Chiliadis conceperim, ut id ſubſidio mittam, quo commendatior & utilior libellus exeat. Nam illi jam ſuperius commemorati fines ſcriptionis, reconditiorem ſenſum habent, adq; paucos pertinent. Et habet ſanè ipſa Chilias tres columnas ſuperadditas, quæ totæ ſe à ſubtilitate illa demonſtrationum ſubducunt, adq; uſum conferunt. Vt igitur, quod in hac editione, temporum & locorum culpâ fuit omiſſum, ſuppleatur, ut ſcilicet Chilias iſta, è penetralibus illis ſpeculationum & demonſtrationum, quarum præcipuè causâ compoſita fuit, etiam ad populares uſus educatur, prius ſunt aliqua mihi præfanda de Titulo. Is profitetur Demonſtrationem legitimam ortus Logarithmorum. Et ſpero faſſuros eſſe Geometras, quod in chartis excuſis hunc ſcopum ſim conſecutus. Profitetur verò etiam Demonſtrationem uſus Logarithmorum. Hic ſubſiſte lector. Dum enim rei demonſtrationem polliceor, rem ipſam præſuppono jam antea notam, vulgoq; tritam. Quænam verò res iſta? quis uſus Logarithmorum? Nimirum is ipſe, qui jam ante decem annos à primo authore Nepero fuit traditus, quiq; tribus verbis poteſt concipi:* Ubicunque occurrunt in Arithmetica communi, inq; Regula Trium duo numeri inter ſe multiplicandi, ibi ſunt eorum Logarithmi in unum ſummam addendi; ubi verò Numerus abſolutus jubetur factum dividere, ibi Logarithmus illius eſt auferendus à Logarithmorum ſummâ: ut Logarithmus illic acervatus, hic reſiduus, monſtret numerum in qualibet operatione quæſitum. *Hic, inquam, eſt uſus Logarithmorum. Hujus uſus demonſtrationem habes in Propoſitionibus* XVIII. XIX. XX. *ut vides in earum Corollariis expreſſis verbis indicatum. Perpende rem, dices, ſcio nihil promiſſum eſſe in tituli verbis allegatis, quod non ſit præſtitum in his tribus Propoſitionibus. Quod verò pulli Arithmeticorum implumes, facilitatum avi-*

 di, ro-

di, roſtra ad hanc uſus mentionem in immenſum pandunt, velut hauſuri omnes præceptiuncularum particularium bolos, quibus exſatientur; id equidem præſtare in chartis iſtis, quæ demonſtrationi fundamentorum erant deſtinatæ, non potui. At dixeris, ſequentia verba Tituli *de novâ Arithmeticâ omninò plura polliceri? Video equidem irritamenta cupiditatum talium, & rideo; mirorq; non incidiſſe mihi, cum ſubito tabellarii diſceſſu ad properandum compulſus, illud* Elogium *inventi* Neperiani, *quo* Typographus *aliquis illiceretur, titulo libelli mei ſubjungerem; fore ut in majus acciperetur, veluti propria mea gloriatio. Sed utcunq; quis hoc meum conſilium accipiat, de intentione ſaltem, me excuſat conſtructio Grammatica.* Non de Chiliadis *libello, non de mea demonſtratione uſus, dictum vides, ſed de* Logarithmis *ipſis, invento ſcilicet* Neperiano; *quod iis nova tradatur Arithmetica.* Nec *ego hæc ſequentia præcepta de uſu* Chiliadis *hujus in id ſubmittenda libello jam excuſo ſtatui, ut hanc poſteriorem tituli partem penitus ad ipſam meam* Chiliada *traducerem: ſegregetur ea pars tituli à labore meo, adq; inventum ipſum* Neperianum, *& ad* Canonem *Logarithmorum Quadrantis referatur.* Non *titulus iſte ſubitò conceptus, ſed utilitas ipſa emptoris me monet, ut quomodo ſingulæ* Chiliadis *columnæ poſſint ad uſum popularem referri & quatenus, pauculis præceptis docerem. Ea verò referam in certa* Capita. *In primo paucula præmittam de Tabula* Chiliadis. *In ſecundum* Caput *referam comparationem* Columnæ *arcuum, cum* Columnâ Rotundorum. *Tertio dicam de comparatione* Columnæ *ſecundæ Sinuum, cum tertia Quadrivicenaria, & quinta ſexageſimorum. Quarto comparabo Quadrivicenariam cum Sexagenariâ. In quinto* Capite *erit uſus Quadrivicenariæ, &* Logarithmicæ *columnarum junctarum. In ſexto Sexagenariæ &* Logarithmicæ. *In ſeptimo comparabitur* Columna *prima arcuum, cum quartâ* Logarithmorum. *In octavo jungentur* Columna *ſecunda Abſolutorum, & Quarta* Logarithmorum. *In nono deniq;* Columna Logarithmorum *jungetur duabus aliis columnis.*

Cor-

CORRECTIO

Figurarum poſt punctum in Logarithmis.

Cùm omnium mille Logarithmorum fines conſignâſſem correctos in ſchedâ; neglexi eos in veſtibulo ex incuriâ; illos igitur fines, & quos Typographus corrupit, ſic reſtitue.

Abſoluti in veſtibulo.	*Fines Logarithmorum.*	*Abſoluti alii.*	*Fines Logarithmorum.*
1.	60.	1500. 00.	52 —.
2.	88.	6800. 00.	77 +.
3.	37 —.	20300. 00.	93 +.
4.	16.	27300. 00.	35.
5.	80 +.	27600. 00.	45.
6.	65.	28800. 00.	49 —.
7.	58.	34300. 00.	49 —.
8.	44.	35900. 00.	29.
9.	14 —.	42300. 00.	31 +.
10.	08 +.	43000. 00.	01.
20.	37 —.	43100. 00.	74 —.
30.	85 +.	43500. 00.	93.
40.	65 —.	61900. 00.	00 +.
50.	29.	67100. 00.	62 —.
60.	13 +.	67700. 00.	40.
70.	07 —.	68300. 00.	04 +.
80.	93 —.	81700. 00.	62 —.
90.	62.	85000. 00.	90 —.
1. 00.	57.	92800. 00.	36 —.
2. 00.	85.	96300. 00.	19 —.
3. 00.	34.	99200. 00.	22 —.
4. 00.	13.		
5. 00.	78 —.		
6. 00.	62.		
7. 00.	55.		
8. 00.	41 +.		
9. 00.	11 —.		
10. 00.	06 —.		
20. 00.	34 —.		
30. 00.	82 +.		
40. 00.	62.		
50. 00.	26.		
60. 00.	11 —.		
70. 00.	04 —.		
80. 00.	90.		
90. 00.	59 +.		

Sicubi alibi quàm in finibus erratum erit in Logarithmis, differentiarum ſeries facilè deteget.

Pra-

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Præterea in textu Demonſtrationum jam impreſſo, notavi iſta, nondum à Typographo animadverſa.

In dedicatione ſic lege, Mercemq; pretium retulit Tringinta acceptis, ſed. *pag.* 4. *Ax.* I. *quocunq; ordine.* p. 18. *lin.* 23. *maximo exiſti.* p. 24. *lin.* 5. & 1000. 500. *p.* 27. *Coroll.* 1. *Chiliadis mul.* *Coroll.* 2. *ut ſi ſic collocentur tres.* p. 28. 30. & 41. *in Schemate arcus punctatus concurrat cum D.* p. 31. *in exemplo, debet eſſe una linea. Ejus reſiduum ad Sinum totum* 29. &c. p. 36. *lin.* 12. *ut* 9. *ad* 8. p. 37. *lin.* 6. *ſic lege, itidem* 100. 05. *menſura igitur proportionis inter* 1000. 900. &c. *lin.* 8. *pro ſic, lege ſcilicet. lin.* 20. *inter* 1000. & 501. p. 54. *lin.* 7. *à fine. Hæc igitur addita Log. lin. penult. quinq;* 127. 149. &c.

PRIMUM CAPUT.

DE TABULA CHILIADIS, EIUSq; COLUMNIS.

PRIMUM *ſciat Lector, Exemplar meum in formâ folii ſcriptum, diviſum fuiſſe in veſtibulum Chiliadis, & in Chiliada ipſam. In veſtibulum accenſentur lineæ* 36. *ut Chiliadis ipſius principium habeatur ibi, ubi eſt numerus* 100.00. *Hac monitione opus eſt. Nam veſtibuli non eſt eadem proportionum ſequela, quæ Chiliadis ipſius, ut apparet ex ipſis Logarithmorum differentiis: quarum ſeries quater ad idem revertitur initium. Quare nec potuit eſſe uſus idem trium columnarum in veſtibulo, qui in Chiliade, eaq; de cauſa relictæ ſunt vacantes: deniq; totum veſtibulum abeſſe poſſet, niſi capite octavo tribuendum id eſſet Analogiæ cum Arithmeticâ communi, & integrationi Numerorum omnium.*

Iam Columnas Chiliadis ipſius vides eſſe quinq;, lineas mille. Prima eſt Columna arcuum Quadrantis, qui habent pro Sinubus Rotundos illos ſecundæ Columnæ numeros. Arcus iſti ſunt expreſſi ternis membris per puncta inter ſe diſcretis, in primo ſunt gradus, in ſecundo ſcrupula prima, in tertio ſcrupula ſecunda, quæ, cum ſuis tertiis & quartis careant, non poſſunt exacta eſſe, præterquam in unico arcu 30. G. *inq; fine Quadrantis. Quanquam inepta eſt cura de parte unius Secundi, cùm ipſa applicatio arcuum*

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horum ad ſuas lineas, rotundis numeris expreſſas, eoq́ effabiles, non ſit ſecuta demonſtrationis alicujus ſubtilitatem; ſed ſolùm popularem inquiſitionem partis proportionalis ex Canone Sinuum. Itaq; fieri poteſt, præſertim circa finem quadrantis, ut ſcrupula ſecunda paucula paſſim vel deficiant, vel abundent. Interlineas inſertæ ſunt differentiæ, quantæ arcubus per ſingulas milleſimas totius ſemidiametri accreſcunt; Earum minima in principio quadrantis eſt 3'.26" +, maxima: in fine quadrantis eſt 153'. 45". ſeu 2. G. 33'. 45". quadragecupla, quintupla minimæ.

Sequitur ſecunda Columna numerorum: ipſorum Rotundorum. Rotundos hic appello, qui continent exactè partes milleſimas ſui Maximi in fine poſiti ſcilicet 100000.00. hoc eſt: Rotundi habentur, qui terminantur in quatuor minimum Cyphras rotundas, Nullas dictas.

Viciſſim Numeri ſcrupuloſi habentur reſpectu chiliadis hujus, qui deſinunt in cyphras ſignificativas, aut qui minus quàm quatuor Nullas habent in fine. Vt 96300.00. eſt rotundus, ſic etiam 90000.00. At 96350.00. & 96357.00. & 96300.68. & 90000.05. ſunt ſcrupuloſi. Atque hi rotundi noſtræ Chiliadis, reſpectu quidem arcuum ad latus ſiniſtrum poſitorum, appellantur SINUS, *reſpectu verò columnarum cæterarum ad dextram appellantur Abſoluti, quia in cæteris columnis intelliguntur numeri ſignificatione aliquâ certâ revincti.*

Hic venit obſervanda cauſa, cur, cùm Chiliada ſcribere propoſuerim, numerus tamen maximus non ſit 1000. ſed potius 100000.00. ejusq́; unitas non 1. ſed 100.00. Deinde cur ſemper ultimæ duæ numeri cujuſque figuræ interpoſito puncto ſint ſeparatæ, & velut abſciſſæ à reliquis verſus ſiniſtram. Cauſa igitur utriuſque rei eſt eadem, quia nimirum in vulgato Canone Sinuum, maximus ſeu ſemidiameter Circuli conſtat figuris

guris

guris totidem, vel enim 100000. *vel* 10000000. *ſolet uſurpari. Et quia Radius ille ad quinque Cyphras continuatus plerunque ſufficit ad calculum, alterius qui ſeptem cyphris exprimitur, rarior eſt neceſſitas: hinc poſtremi Canonis Sinuum excultores cœperunt duas ultimas, tanquam minus neceſſarias, puncto ſeparare. Atq; hoc ego mihi ratus ſum obſervandum in rotundis meis, ut qui ſunt etiam loco Sinuum. Si quis iis, ut abſolutis, velit uti, poterit quatuor ultimas Cyphras rejicere, quoties id uſus aut præcepta ſequentia exegerint.*

Porrò hæc cauſa attinet etiam columnam quartam, quæ præcipua eſt, Logarithmorum ſcilicet cum differentiis, de qua nunc plura dicam.

Primum operæpretium fecerit computiſta, qui hâc Chiliade eſt uſurus, ſi ſubordinationem differentiarum: ſub ſuos Logarithmos ſubtilibus lineolis adjuvet, ut ſingulæ figuræ illarum ſingulis horum reſpondeant.

Deinde notet calculator, numeros hos non eſſe ἀριθμοὺς *abſolutos, ſed eſſe* λογαρίθμους, *numeros ſcilicet relatos ſingulos ad binos alios, numeros proportionem ſignificantes, quæ eſt inter abſolutum ad latus ſiniſtrum poſitum, & inter maximum Chiliadis ſeu* 100000.00.

Tertiò hi Logarithmi omnes ſunt ſcrupuloſi, hoc eſt, non rotundi. Non tamen exhauſta eſt omnis eorum ſcrupuloſitas, continuatione hâc eorum uſque ad duas figuras ultra punctum. Atque hoc indicatur + *ibi per ſigna* + *plus &* — *minus paſſim appoſita.*

Nam quibus nullum tale adeſt ſignum, iis intellige non unam quadrantem unitatis neque deficere, neque abundare: qui verò habent ſignum +, *ii habent inſuper plus quàm quadrantem, minus quàm ſemiſſem unitatis, aut ſummum ſemiſſem: qui denique habent ſignum* —, *eos intellige minuendos*

aliquâ particulâ unitatis, quæ ſit inter quadrantem & ſemiſſem. Qui igitur vult accuratiſſimè computare; is ſi duos logarithmos eſt additurus cum ſigno +, ſummæ poterit addere unum inſuper ſemiſſem: Sin duos cum ſigno —, de ſummâ detrahet ſemiſſem. Et in Subtractione, ſi qui eſt cum ſigno — ſubtrahendus erit ab aliquo cum ſigno + eis reſiduum faciet ſemiſſe auctius. Sin è contrario is qui habet + ſubtrahi debet ab eo qui habet —. Reſiduum ſemiſſe minuendum erit.

Exempla additionis.	12783.34 —	59783.70 +
	230258.52 —	61618.61 +
	243041.85$\frac{1}{2}$	121402.31$\frac{1}{2}$
	ſive 86 —	*ſive* 32 —
Exempla ſubtractionis.	59783.70 +	231263.55 —
	12783.34 —	1005.03 +
	47000.36$\frac{1}{2}$	230258.51$\frac{1}{2}$
	ſive 37 —	*ſive* 52 —

Hæc ſcrupuloſitas locum habet tantùm in Logarithmis, qui ſunt expreſſi in Chiliade, quorum correctionem vide in calce harum paginarum: in aliis intercidentibus præſtari non facilè poteſt: nuſpiam verò eſt abſolutè neceſſaria. Immò plerumq; contemni poſſunt duæ ultimæ poſt punctum. Denique quantò major Logarithmus, tantò minus periculi in neglectu figurarum differentiæ, poſt duas ad ſiniſtram primas omnium.

Reſtant Columnæ Tertia & Quinta. Et in Tertia quidem ſunt numeri Logiſtici non abſoluti; maximus habet 24. G. *quot ſcilicet ſunt unius diei Horæ, etſi poſſunt ſignificare promiſcuè vel horas, vel gradus.*

In quinta rurſum ſunt numeri Logiſtici, complectentes collectionem ſexagenariam: itaq; maximus eſt 60′. Tertia quidem numeros exhibet ſuos tribus membris, in primo ſunt integri gradus vel horæ, in ſecundo ſcrupula prima unius integri, in tertio ſcrupula ſecunda. Quinta duobus membris eſt contenta, ſcrupulis nimirum & ſecundis. Cùm autem diviſio millenaria non ſit apta numeris 24. G. & 60′. fit ut in his duabus columnis ultima unitas ſcrupulorum ſecundorum non ſit exacta: nam minutiæ ejus, quæ minus ſemiſſe efficiunt, neglectæ ſunt, quæ plus, ea completione unitatis ſunt confuſæ & obliteratæ. Pars enim milleſima de 24. G. eſt 0. G. 1′. 26″. 24‴. pro qua ſcripta ſunt 0. G. 1′. 26″. Duæ tales partes ſunt 2′. 52″. 48‴. pro hoc ſcripta ſunt 2′. 53″. Et in ſexagenaria pars milleſima eſt 0′. 3″. 36‴. pro qua ſcripta ſunt 0′. 4″. Duæ milleſimæ ſunt 0′. 7″. 12‴. pro quo ſcripta ſunt 0′. 7″. Itaque quaternis lineis ſemper exceſſu vel defectu peccantibus, ſolæ quintæ ſunt exactæ. Propriam verò & accommodatam hæ columnæ ſubdiviſionem ſortientur in Tabulis Rudolphi. In præſens Chiliadi dandæ fuerunt partes potiores: Et electus eſt à me millenarius, tanquam propria collectio numerorum Abſolutorum: quia, ut initio dictum, ſcopus meus fuit, monere lectorem, quod proportiones, earumq; menſuræ, Logarithmi, accidant primò Numeris Abſolutis. Nihil tamen impedit has duas columnas, Tertiam & Quintam etiam per hanc diſpoſitionem minus exactã, & impropriam, millenariam ſcilicet, fieri utiles: ut in ſequentibus dicetur.

CAPUT II.

De aſſociatione columnæ Arcuum, & columnæ Rotundorum.

DIxi cur in columnâ Numerorum abſolutorum ſtatuerim progreſſionem Arithmeticam continuam ab unitate ad mille,

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ſeu à 100.00. ad 100000.00. & qua ratione, cuilibet ex hiſce rotundis in columnâ Arcuum, aſſociaverim ſuum arcum.

Cùm autem arcus hi omnes ſint ſcrupuloſi, fit creberrimè, ut oblato arcu non ſcrupuloſo, aut ſcrupuloſo quidem, ſed ſic, ut non exactè reperiatur inter arcus Chiliadis, ſed inter binos intercidat, ut his, inquam, arcubus jubeamur aſſignare ſuos ſinus; ut ita Chilias noſtra, quadamtenus etiam ſerviat loco Canonis Sinuum, ejusq́; vices ſuppleat. Id autem fieri poterit hac ratione.

Per arcum Chiliadis proximè minorem propoſito excerpe Sinum Rotundum; Eundem arcum aufer à propoſito: reſidua ſcrupula, prima & ſecunda colloca in regula Detri ad dextram, differentiam verò binorum arcuum, inter quos poſitus intercidit, colloca ad ſiniſtram, in medio colloca numerum progreſſionis perpetuum ſcilicet 100.00. & operare per Regulam Detri, prodibunt enim figuræ 4. ultimæ ſcrupuloſæ adjiciendæ ex ſcripto ſinui rotundo, ſeu loco deletarũ ejus 4. Cyphrarum finalium ſcribendæ.

Viciſſim dato ſinu ſcrupuloſo, indagabimus etiam ejus arcum; ſi cum ſinu rotundo Chiliadis proximè minore quàm eſt propoſitus, hoc eſt, cùm ejus tribus primis figuris ex ſeptem, excerpamus arcum, deinde de differentia interjecta inter duos arcus proximos, ſumamus partem proportionalem ſcrupuloſitati, quam 4. ultimæ ſinus dati figuræ complectuntur.

Hic cùm miſceantur Numeri diverſorum generum, facilè compendium aliquod invenies ex teipſo, ſi bonus es Arithmeticus, ingenioq́; polles. Si verò neſcis compendium; utere noſtro, quod huic rei ſerviturum in Cap. IX. Num. VII. & VIII. rejectum eſt.

Non quidem erit exactiſſima vel una, vel altera operatio, præſertim in fine Quadrantis; quia differentia tunc fit ſubitò magna. Itaque conduceret, decem ultimas differentias in denas ſubdividere. Et interpoſitis Sinubus uſque ad quartam figuram ſcru-

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ſcrupuloſis, ſuos illis ex Canone Quadrantis aſſignare arcus, quod quilibet privatâ operâ poterit. Exceptis verò decem ultimis differentiis, per reliquum Quadrantis perveniemus in notitiam Sinuum ad 5. ſaltem figuras continuatorum, non multò incertius, facilius etiam, quàm per Canonem Sinuum, ad ſingula ſcrupula prima extenſorum: quia laborem quærendæ partis, quæ ſit proportionalis adhærentibus ſecundis, per Logarithmos ſublevamus, ut Capite IX. doceberis. Quomodo etiam ſecantes arcuum, quodammodo haberi ex hâc Chiliade poſſint, infra apparebit Capite VIII.

Iam quorſum ſint nobis utiles Sinus arcuum; id non eſt hujus loci docere, ubi omnia per Logarithmos perficimus. Adeantur libri qui tradunt Doctrinam Triangulorum, per rectos Quadrantis.

CAPUT III.

De comparatione Columnæ ſecundæ Sinuum, cum tertiâ Quadrivicenariâ, vel cum quintâ ſexageſimorum.

Fit interdum, ſic exigente parte Arithmeticæ, quæ Logiſtica dicitur; ut ſemidiameter circuli aliter diviſa offeratur, quàm in partes denarias, centenarias, millenarias, &c. Verbi causâ diameter Solis vel Lunæ deficientis dividitur in partes 12. quas digitos appellamus. Quod ſi igitur detur aliqua portio diametri in partibus, qualium eſt ſemidiameter 100000. Ea portio quæſita inter abſolutos, ſtatim monſtrat è regione ſub Quadrivicenariâ quadruplum numerum digitorum, quos valet illa portio.

Vt ſi

Vt ſi deficiat ſexta pars de ipſâ circumferentiâ Lunæ; ad ſciendum quot digiti ſuperſint in lumine, poſito quod umbra terræ ſecet diametrum, ut recta linea ad rectos angulos: ſuperſunt igitur in lumine 300. *gradus. Horum dimidium eſt* 150. G. *hoc eſt* 90. G. & 60. G. *Partes igitur diametri reſpondentes erunt* 100000. & 86603. *Illa in Quadrivicenariâ oſtendit* 24. G. *iſta* 20. G. 47′. 2″. *Summa* 44. G. 47′. 2″. *Hinc quarta pars eſt* 11. G. 11′. 45″. *Et tot ſunt digiti reſciſſi de diametro.*

Viciſſim ſi deficiat digitus, quid is valet in dimenſione, qualium ſemidiameter, hoc eſt, 6. *digiti, ſunt* 100000? *Quia igitur* 24. *numerus hujus columnæ maximus eſt quadruplum de* 6. *ſume etiam quadruplum digiti unius, id eſt,* 4. G. *Hoc verò quæſitũ in Quadrivicenaria, offert inter Abſolutos* 16675.00. *circiter.*

Eodem modo fit interdum, ut ſemidiameter valeat Authoribus non 100000. *ſed* 60′. *ut ſolet Ptolomæus, & pleriq; Aſtronomorum in indicatione proportionis Orbium. Ii Authores, ſi exprimant in hac dimenſione Sinus arcuum, aut partes quaſcunq; ſemidiametri; quæſitæ eæ partes in Sexagenariâ, exhibent in Abſolutis, valorem illius partis in dimenſione hodiernâ Sinuum progreſſionis denariæ.*

Exempli cauſa, quæritur 38′. 47″. *quantum faciat ſinum, qualium* 60′. *eſt* 100000, *reſpondetur* 64630. *circiter.*

Sic etiam viciſſim quæritur 9265. *Eccentricitas Martis, quot faciat ſcrupula, qualiũ* 100000. *facit* 60′. *reſpondetur* 5′. 33″.

CAPUT IV.

De comparatione Quadrivicenariæ cum Sexagenariâ.

SOlet eſſe pars Tabularum Aſtronomicarum converſio horarum in ſcrupula diei & viciſſim.

Hæc

Hæc converſio habetur per has duas tabulas ſatis exactè, præſertim in quintis lineis, quas rotundas dicere poſſumus.

Verbi causâ Horæ 6.G.28'.54". quot valeant ſcrupula diei? In columna tertia occurrunt 6.G.28'.48". quæ faciunt in quinta 16'.12". exactè, quia linea eſt rotunda & quinarii ultima. Reſiduum igitur 6". unius minuti horarii, quæſita ut horæ, dant 15'.0". quæ jam valent 15‴, junctis ſcilicet apicibus reſidui horarii 6", & horum 15'. horis 6.G. reſpondentium. Ergò totus numerus 6.G. 28'.54". valet ſcrupula diei 16'.12".15‴.

Viciſſim 47'.39". ſcrupula diei quot valent horas?

In Quinta 47'.38". + valent horas 19.G.3'.22". — reſiduum ſecundum unicum ſeu 60‴, quæſita ut 60'. oſtendunt 24". (duobus apicibus, quos illis 60‴. detraxeramus, numero oſtenſo 24.G. ſuperpoſitis.) Ergò propoſita ſcrupula 47'.39". valent horas 19.G.3'.46". — Non prodit enim hic exactum, quia linea eſt ſcrupuloſa, quarta ſcilicet ſui quinarii.

Sed ſi memor eris eorum, quæ capite primo ſunt dicta de his linearum quinariis, quod ſcilicet in primis intelligantur accedere quadrivicenario numero 24‴. in ſecundo deficere 12‴. in tertio accedere 12‴. in quarto deficere 24‴. Et ſexagenario numero in primâ linea deficere 24‴, in ſecunda accedere 12‴. in tertia deficere 12‴. in quarta accedere 24‴. poteris etiam ex quatuor prioribus quinarii lineis exactè excerpere converſiones iſtas. Nam exactè 47'.38".24‴. valent 19.G.3'.21".36‴. Ergò reſidua 36‴. unius ſecundi quæſita, 36". oſtendunt horas 14.G.24'. valentq́ 14".24‴. Itaq́ totus 47'.39". valet exactè horas 19.G.3'.36".0‴.

In Tabulis Rudolphi exacta erit iſta converſio in lineis omnibus, quia ſervabitur naturalis, & propria diviſio numerorum 24.G. & 60.G. in lineis omnibus.

Alia quoque converſio eſt in uſu crebro, Horarum 24. in

Gradus Aequatoris 360. & viciſſim. Et poteſt hæc quoq; converſio perfici ope harum 2. Tabularum in h[u]nc modum.

Quæritur, Hora 19. 25'. 37''. quot faciunt gradus, & ſcrupula Aequatoris. In columna igitur tertia 19. H. 26'. 24''. dat 48'. 36''. exactè. Sed temporaria 47''. quæſita ut temporaria 47'. dant 1'. 58''. quæ valent 1''. 58'''. Ergò propoſita 19. H. 25'. 37''. dant 48'. 34''. 2'''. quæ multiplica in 6, & diminue apices, proveniunt 291. G. 24'. 12''. Gradus Aequatoris.

Viciſſim Gradus Aequatoris ſic convertes in horas: Divide eos per 6, & auge apices: quotiens in ſexagenariam immiſſus, oſtendit è regione horas quæſitas.

Quæruntur gr. 259. 34'. 17''. quot ſint horæ?

Sexta pars eſt — 43. 15. 43. Quære igitur 43'. 15''. 43'''. & monſtrabunt in tertia 17. H. 18'. 14'' —.

CAPUT V.

De Quadrivicenariâ cum Logarithmis compoſita.

I. *TAbula Diurnorum & Horariorum ſolet Ephemeridibus præfigi, prolixa admodùm: ubi docemur, dato diurno excerpere horarium, ad datum horarum numerum. Excerptio ipſa licet non fatiget mentem multiplicatione, fatigat tamen & mentem additione, & oculos manusq; excerptione. At hîc conjunctio Columnæ quartæ cum tertia, & tollit neceſſitatem Tabulæ diurnorum, & opus peragere docet longè facilius, quippe additione ſimplici (non Logiſtica) Logarithmorum.*

Quare enim tam diurnum, quàm horas in Quadrivicenaria, & Logarithmos ab iis monſtratos adde in unam ſummam:

quæ

quæ inter Logarithmos quæſita, monſtrabit è regione in Columna tertiâ portionem motus competentem horis.

Vtile eſt hoc Præceptum, ubi magnus eſt diurnus, non major tamen quàm Gr. 24. ut in Lunâ & Cometarum nonnullis.

EXEMPLUM.

Sit diurnus Lunæ	14. G. 23′. *Quæritur quantum*	
competat Horis	19.	42.
Logarithmus ad	14.	23. 0″. *eſt* 51200. *circiter.*
Logarithmus ad	19.	42. 0. *eſt* 19730. *circiter.*
		Summa 70930.

Hæc quæſita inter Logarithmos, oſtendit in Quadrivicenariâ 11. G. 48′. 0″. *Tot gradus competunt horis* 19. 42′.

ALIUD EXEMPLUM.

Sit diurnus	2. G.	15′.	*Horæ* 9. 38′.
Logarithmus 2.		15.	*eſt* 237000. *circiter.*
Logarithmus 9.		38.	*eſt* 91200. *circiter.*
			Summa 328200. *dat* 0. G. 54′. 0″.

Poteſt verò hoc exemplum, ubi diurnus eſt adeò parvus, aliter etiam & faciliori viâ computari, quam referam in Caput 9.

II. *Huc pertinet etiam Ratio computandi Adſpectus Lunæ cum ſtellis. Vt ſi detur ſeparatio diurna duorum Planetarum, & diſtantia eorum, minor quàm illa; quæraturq́; quot horis ea conficiatur?*

Tunc enim à Logarithmo Diſtantiæ, auferatur Logarithmus ſeparationis diurnæ, reſiduum inter Logarithmos quæſitum, oſtendit è regione ſub Quadrivicenariâ horas competentes.

EXEMPLUM.

Sit Mercurii diurnus Retrogradus 2. G. 15′.
Lunæ directus -- -- -- -- -- 15. 2.
Separatio igitur diurna -- -- 17. 17.
Logarithmus eſt -- -- -- 32840. *circiter*
Sit Diſtantia Lunæ & Mercurii - 12. 23.
Logarithmus -- -- -- -- -- 66170. *circiter*

Reſiduum -- -- 33330. *dat* 17. G. 12′.

Tot igitur horis fit aſpectus Lunæ, ante vel poſt momentum, quo invenitur hæc diſtantia, prout Luna poſt vel ante Mercurium fuerit.

Si uterq; Directus, vel uterq; Retrogradus eſſet; minor diurnus à majori ſubtraheretur, ad eruendam ſeparationem diurnam, uti docemur in Aſtronomia. De Aſpectibus tardiorum inter ſe infra Cap. 9.

III. Diurnum indagare (minorem quidem quàm 24. H.) ex motu aliquot horarum.

Tunc Logarithmum horarum aufer à Logarithmo Motus competentis, reſtabit Logarithmus motus diurni.

EXEMPLUM.

Promotum deprehendatur Sidus aliquod in horis 4. 27′. *Gradus* 1. 53′. *quantus erit diurnus?*
Gradus 1. 53′. *Logar.* 254500. *circiter.*
Hor. 4. 27. *Logar.* 168400.

Reſiduum 86100. *dat gr.* 10. 9′. *diurnum.*

Infra Cap. 9. erit alius modus pro diurnis parvis.

IV. Datis tribus ſtellis in unâ rectâ, datisq; ſingula-

rum

rum latitudinibus, duarum verò ſolarum longitudinibus; indagare & tertiæ longitudinem.

Idem, ſi pro latitudinibus notæ fuerint declinationes, pro longitudine verò ſumatur Aſſenſio Recta.

Cùm hæ rectæ plerumq; ſint breves & infra 24. G. nihil nobis nocebit, abuſus ἀπεχν@ curvilineorum ut rectilineorum triangulorum.

Pone in Regula Detri, ad ſiniſtram, Differentiam latitudinum duarum, in medio differentiam longitudinum earundem; ad dextram differentiam iterum latitudinis ſtellæ tertiæ & priorum unius; quæſitisq; his arcubus in Quadrivicenariâ, exſcribantur Logarithmi; additisq; ſecundo & tertio, de ſumma dematur primus; reſtabit Logarithmus differentiæ longitudinis ſtellæ tertiæ.

Vſus hujus præcepti peropportunus eſt in tractatione obſervationum per lineas rectas trium ſtellarum.

CAPUT VI.

De Sexagenariâ cum Logarithmis compoſitâ.

TAbulæ Hexacontádon uſus eſt in Logiſticâ multiplex, præcipuus quidem ad multiplicationes & diviſiones Logiſticas, ſcrupuloſitatis infinitæ, ubi ſit progreſſio ad tertia, quarta, quinta, ſexta, & ſic deinceps. Tantam ſubtilitatem non profitetur uſus Chiliadis noſtræ. Maneat igitur hæc utilitas propria Tabulæ Hexacontádôn.

Sed quia hæc Tabula præfigi ſolet etiam Tabulis Aſtronomicis & Ephemeridibus, in quibus non ſit progreſſio ultra ſecunda, vel ad ſummum tertia: hunc ejus uſum Tabula noſtra ſexagenaria

genaria pleniſſimè præſtat, ejusq́; neceſſitatem penitus tollit: quod docebo præceptis ſequentibus.

I. Multiplicationes logiſticas perficere compendioſiſſimè.

Primum capiant numeri, qui ſunt in ſe mutuò multiplicandi, denominationes ſeu apices familiares Tabulæ Chiliadis. Nam quia in Logiſtica apices antecedentes integra I. G. *verſus ſiniſtram, ſunt indices ſexagenarum, ſequentes verò integra* I. G. *ſunt indices ſexageſimorum ſcrupulorum, ſeu fractionum unius integri: ſciendum igitur, numeros in columnâ ſexagenariâ propriè intelligi de ſexageſimis ſcrupulis primis & ſecundis, tanquam fractionibus unius integri. Ergò ſi offerantur gradus & minuta in datorum alterutro, pro gradibus ſcribantur Minuta, pro Minutis Secunda. Tunc iis in ſexagenaria quæſitis, excerpantur Logarithmi, addanturq́; in unam ſummam; quæ inter Logarithmos quæſita exhibebit ſub ſexagenaria factum in primis & ſecundis. Sed ſi prius apices multiplicandorum fuerunt mutati, nunc etiam facti apices erunt mutandi in contrarium, nam quot apices utriq́; junctim additi ſunt, totidem jam uni ſoli quotienti ſunt adimendi, & viciſſim.*

EXEMPLUM.

Sint Multipcandi 25′. 35″. *Log.* 85240.
& 49′. 50″. *Log.* 18566.

Summa 103806. *dat* 21′. 14″. *factum.*

ALIUD.

ALIUD.

15. G. 38′. 40″. *ſint multiplicanda in* 53′. 49″.

Scribe 15′. 38″. 40‴. *Log.* 134400. *Hic apices aucti ſunt*
& 53′. 49″. *Log.* 10900. *unitate.*

Summa 145300. *dat* 14′. 2″.

Sed ſcribe 14. G. 2′. *detracta ab apicibus unitate viciſſim.*

ALIUD.

Sexagenæ. *Sexageſimæ.*

39. G. 20′. *ſint multiplicanda* ′46. 15. G.

Scribe 39′. 20″. *Log.* 42227. *Hic apices aucti unitate.*
46′. 15″. *Log.* 26028. *Hic apices aucti binario.*

Summa 68255. *dat* 30′. 19″. 0‴.

Sed ſcribe ″30. ′19. 0. G. *detracto ternario ab apicibus ſexageſimariis.*

Scilicet hic factus non eſt 30′. *ſcrupula ſexageſima prima,* & 19″. *ſecunda, ſed* ″30. *ſexagenæ ſecundæ* & ′19. *primæ, &c.*

ALIUD EXEMPLUM.

Sint multiplicandæ ſexagenæ ′37. 41. G. *in ſexageſima* 32″. 29‴.

Scribe 37′. 41″. *Log.* 46513. *Hic apices ſunt aucti binario.*
32′. 29″. *Log.* 61362. *Hic apices deminuti unitate.*

Summa 107875. *dat* 20′. 24″.
Sed ſcribe 20. G. 24′.

Nam propter primum detrahendus eſſet ab apicibus binarius, proter ſecundum addenda unitas viciſſim. Compenſatione igitur contrariorum facta, adhuc detrahenda fuit à facti apicibus unitas.

II. Qua-

II. Quadrare numerum Logiſticum facillimè.

Rurſum eſto memor, quod numeri in ſexagenariâ ſint fractiones, eoq́ue numerus quadratus prodiens, quod æſtimationem apicum attinet, minor ſeu minoris valoris ſit, quàm quadrandus. Propriiſſimè quidem quadratus, de quo quæritur: ſic eſt ad quadrandum, ut hic ad unitatem 1. G. *ſeu* 60′. *ſcr. ut ſit quadrare logiſticè nihil aliud, quàm tertiam proportionalem à maximo columnæ ſexagenariæ invenire.*

Numeri igitur quadrandi in ſexagenariâ quæſiti Logarithmum duplica, duplum in Logarithmis quæſitum exhibet ex ſexagenariâ quadratum, quod quærebatur.

EXEMPLUM.

Sit quadrandus 49′. 53″. *Ejus Logarithmus* 18450. *dupletur ut ſit* 36900. *hoc in Logarithmis quæſitum exhibet* 41′. 29″. *Dico igitur* 41′. 29″. 0‴. 0⁗. *eſſe quadratum numeri* 49′. 53″.

Si quid mutandum in apicibus, ut Quadrandus inveniri poſſit in Chiliade, tunc valent præcepta eadem, quæ prius in multiplicatione, tantummodò ut memineris, Quadrandum eſſe vice duorum in ſe multiplicandorum.

III. Diviſiones Logiſticas perficere compendioſiſſimè.

Primò obſerventur eadem de aptatione apicum, quæ prius circa multiplicandos. Deinde obſerva, num dividendus (ſic aptatus ſi opus fuit) major fuerit, quàm diviſor, an minor. Nam ſi major, non propriè pertinet operatio ad Chiliada; ſed ejus loco dividendus eſt, vel exceſſus ejus ſupra diviſorem, vel ejus pars aliquota, minor diviſore.

Si igitur hoc pacto dividendus logiſticus fuerit minor ipſo

diviſore, Tunc Bogarithmus diviſoris, auferatur à Logarithmo dividendi; reſtabitq́ Logarithmus Quotientis. Atq; is quotiens vel erit exceſſus itidem, addendus dividendo, ut conſtituatur verus quotiens, vel erit itidem pars æquè multiplex quotientis, vel denique, ſi nulla permutatio facta in datis numeris, erit ipſe quotiens.

At mutatio in apicibus facta adhuc eſt compenſanda. Nam quantum fuit additum vel ſubtractum Apicibus diviſoris, tantum etiam addendum vel ſubtrahendum Apicibus Quotientis. Quantum verò apicibus dividendi vel additum, vel ſubtractum: tantum contrariâ ratione ſubtrahendum vel addendum apicibus Quotientis, ſeorſim utrumq;.

EXEMPLUM.

Dividantur 29'. 30''. *Log.* 70995.
in 59'. 0''. *Log.* 1681.

69314. *dat.* 30'. 0''.

Hic nulla eſt facta mutatio apicum, nec in diviſore, nec in dividendo, quippe dividendus erat minor diviſore, caſusq́ proprius Chiliadi. Ergò 30'. 0''. *erit quotiens juſtus. Quod mirari non debes* 29' $\frac{1}{2}$ *diſtributa in partes* 59', *facere portiones magnitudine* 30'. *majore, quàm erat totus dividendus. Debes enim cogitare, illa* 59'. *non eſſe integra, ſed fractionem unius integri, proinde quotiens* 30'. *eſt portio debita non uni* 1'. *ſcrupulo primo, ſed uni* 1. *integro.*

ALIUD.

Dividantur Gr.	6'. 0.	*Scribe*	6'. 0''. *Log.* 230258.
In dies	59. 3'.		59'. 3''. *Log.* 1550.
			Reſiduum 228708.

Hoc reſiduum oſtendit 6′. 8″. Si ergò dati habuiſſent illos apices, cum quibus excerpſimus Logarithmos, *tunc quotiens hic fuiſſet. At quia apicibus dividendi ſunt adjectæ duæ unitates, ſic ut ex* 0. G. *fierent ſexageſima* ″0. *ex ſexagenis verò* ‵6. *fierent ſexageſima* ″6: *Viciſſim igitur quotienti huic* 6′. 6″. *adimendi duo apices ſexageſimarii, ut fiat* ‵6. 6. G. *Quia verò etiam diviſoris apicibus fuit adjecta unitas ſexageſimaria, ut pro* 59. G. *ſcriberentur* 59′. *& pro* 3′. *ſcriberentur* 3″. *rurſum igitur idem eſt faciendum Quotienti primo mutato, ut pro* ‵6. 6. G. *ſcribatur itidem* 6. G. 6′.

EXEMPLUM UBI DIVIDENDUS MAJOR.

Dividantur 57′. 23″. *major.*
in 41′. 15″. *ut minorem.*

Subtrahe manet 16′. 8″. *reſiduum jam minus diviſore.*
Ergò divide 16′. 8″. Log. 131350.
in 41′. 15″. Log. 37470.

Reſiduum 93880. *oſtendit* 23′. 29″.

Cui adde diviſorem ipſum totum ſemel, quia ſemel tantum erat ſubtractus à dividendo, colligitur 1. G. 4′. 44″. *Quotiens debitus uni integro, cujus diviſor* 41′. 15″. *erat pars ſeu fractio.*

EXEMPLUM DE PARTE ALIQUOTA.

Sint dividendi 3. G. 45′. 13″. *per* 57′. 8″. *Cùm igitur contineatur diviſor in dividendo craſſâ æſtimatione, minus quàm quater: operabor per dividendi partem quartam, quæ facilè ſumitur, eſtq́;*

56′. 18″. 15‴. Log. 6360.
Diviſoris 57′. 8″. Log. 4900.

Reſiduum 1460.

Hoc

Hoc oſtendit quotientem 59'. 8''. *Hujus igitur ſumendum eſt iterum quadruplum ſcilicet* 3. G. 56'. 32''.

Nota hoc Exemplum potuiſſet etiam tractari aliter pro 3. G. 45'. 13''. *ſcribendo* 3'. 45''. 13'''. Log. 277000.

Diviſor 57'. 8''. Log. 4900.

Reſiduum 272100.

Hæc enim oſtendit 3'. 56''. 30'''. *Quia verò apicibus dividendi fuit appoſita unitas: detrahatur viciſſim apicibus quotientis unitas, fietq́ quotiens* 3. G. 56'. 30''. *ut prius.*

Quomodo compendioſè ſit agendum, ſi dividendus fuerit aliquoties major diviſore, tradetur infra Capite 9. *modus etiam alius.*

IV. Operari per Regulam Proportionum, Detri dictam, in Logiſticis.

Si trium datorum unus ſit pura unitas, ſic ut ea poſſit aptari pro 1. G. *ſeu* 60': *ſiquidem hæc unitas fuerit primo loco ad ſiniſtram: tunc operatio abſolvitur per meram additionem* Logarithmorum, *loco primo traditam: Sin autem fuerit hæc pura unitas* 1. G. *ſeu* 60'. *loco ſecundo vel tertio; tunc operatio perficitur per ſimplicem ſubtractionem* Logarithmorum *loco ſecundo propoſitam. At ſi nuſpiam fuerit pura unitas, tunc ſiniſtimi* Logarithmus, *aufertur à ſumma duorum* Logarithmorum *reſiduorum, ſi poteſt: vel quod idem eſt, ſiniſtimi* Logarithmus *aufertur ab uno duorum reſiduorum, ſi poteſt; reſiduum addetur* Logarithmo *tertii: utroque modo conficitur* Logarithmus *Quotientis.*

EXEMPLUM.

29′. 45″. - *dat* - 15′. 43″. - *quid* - 58′. 47″?			*Vel* 133970.
Log. 70150.	133970.	2050.	*Aufer* 70150.
		Adde 133970.	
			Reſid. 63820.
		Summa 136020.	*Adde* 2050.
		Aufer 70150.	
			65870.
		Reſiduum 65870.	*ut prius.*

Quotiens oſtenditur 31′. 3″.

Si ſiniſtimi Logarithmus à ſummā reliquorum ſubtrahi non poteſt, ſi nimirum ſiniſtimus datus, minor fuerit utroq; reliquorum dato ſeorſim: id indicio eſt, Quotientē excreſcere ſupra I. G. *ſeu* 60′. *Quare operare per ſecundi vel tertii partem aliquotam, quotientiſq; prodeuntis ſume æquè multiplicem: vel operare per exceſſum alterutrius datorum, ſupra datum ſiniſtimum; Quotientiq; emergenti adjunge ipſum ſiniſtimum: uti in diviſione doctus es.*

V. A Numero Logiſtico propoſito, Radicem extrahere Quadratam facillimè.

Ne turberis, quod Radix ſit major ſuo Quadrato: fit enim hoc propterea, qui numeri Sexagenariæ ſunt fractiones unius integri: ut ſuprà dictum. Radix enim Logiſtica nihil eſt aliud, quàm medium proportionale inter integrum I. G. *& numerum Logiſticum integro minorem, vel etiam majorem.*

Ergò numeri propoſiti Logiſtici Logarithmum bipartire, Semiſſis enim quæſitus inter Logarithmos in ſexagenariâ oſtendet radicem quæſitam.

EXEMPLUM.

Quadratus eſto 50′. 27″. *Logar.* 17360.
Semiſſ. 8680.

His

Hic ſemiſſis oſtendit Radicem 55′. 0″. *eritq́ ut* 1. G. 0′. 0″.- *ad*-55′. 0″.-*ſic hoc ad* 50′. 27″. *ferè.*

Quod ſi Quadratus habuerit alios apices, quàm in ſexagenariâ, quæratur ejus partis quadratæ, quæ minor fuerit integro, puta quartæ, vel nonæ, vel ſedecimæ, &c. radix, eaq́ inventa viciſſim duplicetur, triplicetur, vel quadruplicetur, &c.

Sit Quadratum 1. G. 39′. 20″. *Hic cùm excurrat ſupra integrum, ſic ut inveniri non poſſit in ſexagenariâ, tantò ejus quadrantem* 24′. 50″. *Hic cùm jam inveniatur in ſexagenariâ, ejus ergò Log.* 88190, *ſemiſſis* 44095. *oſtendit* 38′. 36″. *radicem Quadrantis; Ejus ergò duplum* 1. G. 17′. 12″. *eſt radix quæſita; ſeu magis propriè eſt medium proportionale inter* 1. G. 0′. 0″. *&* 1. G. 39′. 28″.

Mirabitur hoc imperitus, quomodo 1. G. 17′. *ſit radix de* 1. G. 39′. *reputans illic eſſe* 77′. *hic* 99′. *& verò radicem de* 99′. *eſſe paulò minorem quàm* 10′. *At memineris integrum in ſexagenariâ non eſſe unum ſcrupulum, ſed unum gradum: proinde hujus unitatis linearis quadratum, itidem eſt unitas ſuperficiaria valens Gr.* 1. *ſeu* 60′. *Et ſic unitatis linearis, cum fractione appendice, per* 17′. *expreſſâ, quadratum rectè ſit unitas ſuperficiaria cum fractione appendice per* 39′. *expreſſâ. Si verò cogitationem ab hâc unitate gradus transferas ad unitatem ſcrupulariam: tunc unitas linearis ſcrupularia, quadratum habet, unitatem ſuperficiariam, quæ valet ſcrupulum: Et ſic prioris unitatis graduariæ* 60′. *ſcrupula in formam redacta quadratam, latus habebunt paulò brevius* 8. *unitatibus lineæ ſcrupulariæ. Vnde elucet conſenſui rei utriusque.*

VI. Inter duos numeros Logiſticos medium proportionale conſtituere.

Si datorum unus eſt 1. G. 0′. 0″. *jam modò doctus es idem facere per extractionem radicis. Hæc eſt enim medium proportionale. Sit*

le. Si verò non eſt integrum ſexagenariæ, ſcilicet I. G. *inter datos, adde datorum Logarithmos, ſummæ ſemiſſem quære inter Logarithmos, & excerpes ex ſexagenariâ quæſitum Medium proportionale.*

EXEMPLUM.

Sint dati 25′. 35″. *Logarith.* 85240.
& 49′. 50″. *Logarith.* 18566.

Summa 103806.
Semiſſis 51903. *dat* 35′. 43″.

Erit igitur ut 25′. 35″. *ad* 35′. 43″, *ſic hoc ad* 49′. 50″.

VII. In ſpecie hîc docemur partem proportionalem venari, in Tabulis æquationum & alibi.

Fit autem ſecundum præcepta præmiſſa multò compendioſiſſimè, quoties totum, quod debetur uni gradui, ſeu Horæ, ſeu 60. *minutis, non ſuperat* 60′. *minuta. Adduntur enim Logarithmi:* 1. *Differentiæ uni gradui, vel horæ reſpondentis, &* 2. *ſcrupulorum, integris gradibus vel horis adhærentium, ſumma inter Logarithmos quæſita exhibet, ad latus ſub ſexagenariâ partem proportionalem quæſitam.*

Sit Anomalia 136. G. 47′. 14″. *& excerpatur cum integris* 136. G. *æquatio* — 4. G. 15′. 23″. *Sitq; differentia æquationum duarum vicinarum decreſcentium* 37′. 29″. *Quæritur Pars proportionalis ſcrupulis* 47′. 14″.

Logarith. 47′. 14″. *eſt* 23920. *circiter.*
Logarith. 37′. 29″. *eſt* 47050. *circiter.*

Summa 70970. *dat* 29′. 30″. *partem proportionalem decrementi, ablata igitur hæc à* 4. G. 15′. 23″. *relinquit* 3. G. 41′. 55″. *æquationem correctam.*

EXEM-

EXEMPLUM ALIUD.

Sit Horarius 31'. 24". *ſint Minuta unius Horæ* 41'. 48". *quæritur quantum iis debeatur de Horario? Adde Logarithmos* 64770, *&* 36150. *Summa* 100920, *oſtendit partem proportionalem* 21'. 52".

VIII. Dato Horario Lunæ à Sole, datisq; ſcrupulis incidentiæ, Moræ dimidiæ, vel durationis dimidiæ: eruere Tempus incidentiæ, Moram dimidiam, vel durationem dimidiam in Eclipſibus.

Vel:

Dato Horario, datoq; arcu percurrendo, indagare numerum Horarum & Minutorum, intra quos arcus percurritur.

Primum aufer Horarium Lunæ à Sole quoties potes à datis ſcrupulis, totiesq; ſcribe unam Horam.

Deinde à Logarithmo reſidui, quod minus erit Horario, aufer Logarithmum Horarii, reſtabit Logarithmus Minutorum horis integris adjiciendorum.

Sint ſcrupula 53'. 16".
Horar. Lunæ à Sole 31'. 24". *Aufer ſemel & ſcribe Hor.* 1.

Reſiduum 21'. 52". *Logar.* 100920.
Horarii 31'. 24". *Logar.* 64770.

Reſiduum 36150. *dat* 41'. 48".

Ergò tempus eſt H. 1. 41'. 48".

IX. Da-

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IX. Dato numero Horarum & Minutorum, cui reſpondeat datus minor numerus Graduum & Scrupulorum, inquirere Horarium: oportet autem Horarum numerum infra 60′. eſſe.

Quære datos (diminutis ſignis) in ſexagenariâ, & Logarithmum Horarum, aufer à Logarithmo graduum; reſiduum eſt Logarithmus Horarii ex eadem ſexagenaria excerpendi cum ipſis ſignis.

Vt ſi horis 50. 26′. Luna promoveatur Gr. 28. 3′.
Diminue ſigna, ut ſtent illic 50′. 26″. hic 28′. 3″.
Iam igitur à Logarithmo 28′. 3″. ſc. 76036.
Aufer Logarithmum 50′. 26″. ſc. 17469.

Reſiduum 58567. oſtendit Horarium 33′. 24″. retentis ſignis.

APPENDIX.

Si plures eſſent gradus quàm horæ, aufer numerum Horarum à numero Graduum quoties potes, totiesq; ſcribe unum gradum in quotiente. Deinde cum eo, quod de gradibus fuerit reſiduum, operare, ut jam dictum, prodibuntq; ſcrupula & ſecunda, gradibus integris in quotiente ſcriptis, addenda.

Sed hæc Cap. 9. tradantur per alium modum ſimpliciorem, & magis proprium, ut mutatione apicum non ſit opus.

COMPENDIUM.

Conducit etiam ad brevitatem, ſi major numerus fuerit infra 30, uti tunc operemur per utriuſq; duplum.

Vt ſi Horis 25. 13′. Luna promoveretur Gr. 14. $1\frac{1}{2}$. hoc perinde eſſet ac ſi Horis 50. 26′. reſponderent gr. 28. 3′.

X. Si

X. Si Triangulum Rectangulum, ſeu planum, ſeu Sphæricum, omnia latera minora habuerit, quàm 1. G. ſeu 60′: tunc datis duobus lateribus circa rectum, per Logarithmos invenire latus tertium recto ſubtenſum, ſeu Baſin.

Facilius quidem fit, in Sphæricis quidem per Antilogarithmos Canonis, ſeu ut Cap. 7. dicatur, per Logarithmos complementi: ſi tamen per opportunitatem etiam ſexagenariâ placeat uti: ſic poterit operatio inſtitui.

Logarithmos laterum excerptos ſingulos ſeorſim duplica, cum his duplis, ut Logarithmis, excerpe laterum Quadrata ex ſexagenariâ, eaq; in unam ſummam adde, ſumma quæſita in ſexagenaria, exhibebit è regione Logarithmum, cujus ſemiſſis, ut Logarithmus quæſitus, ex eadem ſexagenariâ exhibebit Baſin quæſitam.

Ut ſi ſint latera 28′. 17″. *&* 50′. 31″. *Eorum Logarithmi* 75200. *&* 17200. *dupli horum* 150400. *&* 34400. *oſtendunt quadrata laterum* 13′. 20″. *&* 42′. 32″. *Summa utriuſq; eſt* 55′. 52″. *Hujus Logarithmus* 7140. *Et hujus ſemiſſis* 3570. *oſtendit Baſin* 57′. 54″.

XI. Viciſſim datâ Baſi, in ſic comparatis, & latere alterutro, invenire latus reliquum.

Rurſum duplicia Logarithmos baſis & lateris dati; per hæc dupla excerpe quadrata ex ſexagenariâ, minusq; à majori ſubtrahe; reſidui Logarithmus eſt duplus Logarithmi lateris quæſiti: ut ſi Baſis 57′. 54″. *latus* 28′. 17″. *Logarithmi* 3570. 57200. *Duplicati ſunt* 7140. 150400. *Quadrata* 55′. 52″. *&* 13′. 20″. *Reſiduum* 42′. 32″. *Logarithmus* 34400. *dimidium* 17200, *quod oſtendit* 50′. 31″. *latus quæſitum.*

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CAPUT VII.

De copulatione columnæ arcuum cum columnâ Logarithmorum.

Per ſolos Logarithmos Arcuum & Angulorum, omnia Triangula Sphærica ſolvere, omnia ſcilicet quæſita ex tribus datis eruere.

PRima autem ſunt Rectangula, eorumq́ caſus ſedecim, in quibus inter tria data intelligitur ſemper ipſe Rectus Angulus.

Hic autem vox Complementi crebrò uſurpanda, cùm ſic ſolitariè ſumitur, ſemper dat ſubintelligi ad Quadrantem : *Baſis verò vox pro latere maximo ſumitur, quod ſcilicet angulo recto opponitur. Et loquimur de talibus Rectangulis, quorum latera ſunt minora quadrante ſingula.*

I. Ex Baſi & angulo latus oppoſitum.

Addantur invicem Logarithmi datorum, conficitur Logarithmus quæſiti lateris.

II. Ex lateribus Baſin.

Addantur invicem Logarithmi Complementorum datorum laterum, conficietur Logarithmus Complementi quæſitæ Baſis. Vide Cap 6. Numero 10. *modum alium.*

III. Ex Angulo & latere adjacente Angulum reliquum.

Addantur invicem Logarithmi anguli, & Complementi lateris, conficietur Logarithmus complenti quæſiti Anguli.

IV. Ex

IV. Ex Baſi & Latere Angulum oppoſitum.

Auferatur Logarithmus Baſis à Logarithmo lateris, reſtabit Logarithmus Anguli oppoſiti.

V. Ex Angulo & latere oppoſito, Baſin.

Auferatur Logarithmus Anguli à Logarithmo *lateris oppoſiti, reſtabit* Logarithmus *Baſis.*

VI. Ex Angulo & latere ſubtenſo Angulum reliquum.

Auferatur Logarithmus *Complementi lateris dati à Logarithmo Complementi Anguli dato oppoſiti, reſtat* Logarithmus *ipſius Anguli reſidui quæſiti.*

VII. Ex latere & Baſi latus reliquum.

Auferatur Logarithmus *Complementi lateris à Logarithmo Complementi Baſis, reſtabit* Logarithmus *Complementi lateris reliqui. Vide ſuprà Cap. 6. Num. 11. modum alium.*

VIII. Ex Angulis latus.

Auferatur Logarithmus *anguli, qui lateri quæſito adjacet, à* Logarithmo *Complementi Anguli oppoſiti, reſtat* Logarithmus *Complementi lateris quæſiti.*

IX. Ex lateribus Angulum.

Addantur in unam ſummam Logarithmi *Complementorum datorum, laterum ſumma excerpat arcum: Ejus arcus Complementi* Logarithmus, *auferatur à* Logarithmo *lateris quæſito angulo oppoſiti, reſtat* Logarithmus *Anguli quæſiti.*

Pro his compoſitis caſibus, aptior eſt Canon ipſe Logarithmorum Quadrantis, quàm Chilias no-

X. Ex Baſi & Angulo reſiduus angulus.

Addantur in unam ſummam Logarithmi datorum, ſumma

ma excerpat arcum: ejus complementi Logarithmus auferatur à Logarithmo complementi Anguli dati, reſtabit Logarithmus Anguli quæſiti.

ſtra: quia in illo non opus eſt excerptione arcus, quippe cum ejus complemẽtum, ſtatim cum Logarithmo ſuo è regione in conſpectum veniat. Ut jam non dicam, quòd Meſologarithmi Canonis, quibus caret Chilias noſtra, præſtent hos compoſitos etiam ſimplices.

XI. Ex Angulo & latere adjacente, latus oppoſitum reliquum.

Addantur in unam ſummam Logarithmi, Anguli & complementi lateris, ſumma excerpat arcum: ejus complementi Logarithmus auferatur à Logarithmo complementi anguli dati, reſtabit Logarithmus complementi lateris quæſiti.

XII. Ex Baſi & Angulo latus adjacens.

Addantur Logarithmi datorum, ſumma excerpat arcum; ejus complementi. Logarithmus auferatur à Logarithmo complementi Baſis, reſtabit Logarithus complementi lateris quæſiti, angulo adjacentis.

XIII. Ex Baſi & latere Angulum adjacentem.

Auferatur Logarithmus complementi lateris à Logarithmo complementi Baſis, reſiduum excerpat arcum, ab hujus complementi arcu, auferatur Logarithmus Baſis, reſtabit Logarithmus anguli adjacentis.

XIV. Ex Angulo & latere oppoſito latus reliquum.

Auferatur Logarithmus Anguli à Logarithmo lateris, reſiduum excerpat arcum, à cujus complementi Logarithmo, auferatur Logarithmus complementi lateris: reſtabit Logarithmus complementi lateris reliqui.

XV. Ex Angulo & latere adjacente Baſin.

Addantur invicem Logarithmi Anguli & complementi lateris; ſumma excerpat arcum; hujus complementi Logarithmus

mus auferatur à Logarithmo lateris dati, reſtabit Logarithmus Baſis.

XVI. Ex Angulis Baſin.

Auferatur Logarithmus anguli unius à Logarithmo complementi Anguli alterius; reſiduum excerpat arcum, ab hujus complementi Logarithmo, aufer Logarithmum ipſius Anguli alterius, ſeu poſterius hîc adhibiti, reſtat Logarithmus Baſis.

EXEMPLUM CASUUM OMNIUM.

Sit Baſis 72. G. 0′. *Angulus* 50. G. 0′.

	Logarithmi.	Complementa.	Logarithmi.
Baſis 72. G. 0′. F	5030. A	18. G. 0′. L	117440. O
Angulus 50. 0′. G	26650. B	40. 0. M	44190. P
Latus oppoſitũ 46. 45′. H	31680. C	43. 15. N	37805. Q
Latus majus 63. 12′. I	11370. D	26. 48. R	79635. T
Angelus major 69. 48′. K	6340. E	20. 12. S	106350. V

Hoc Exemplum ſic fuit conſtructum.

F. G. *ſunt ex arbitrio, quæ dant* L. M. *Ergò habentur* A. B. O. P. *Iam per I. ex* A. B. *habetur* C. *hinc* H. *hinc* N. *hinc* Q. *Tunc per VII. Ex* O. Q. *habetur* T. *hinc* R. *hinc* I. *hinc* D. *Etiam per IV. ex* A. D. *habetur* E. *hinc* K. *hinc* S. *hinc* V. *Reliqua Præcepta omnia erunt loco probationis, verbi causâ ex prim. Ex Baſi* F. *& angulo* K. *latus* I. *illi oppoſitum, invenitur enim* D. *qui dat* I.

Ex primo.	Ex ſecundo.	Ex Tertio.	
5030. A.	37805. Q.	26650. B.	6340. E.
6340. E.	79635. T.	79635. T.	37805. Q.
11370. D.	117440. O.	106285. V.	44145. P.
	pro	106350. *pro*	44190.

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Ex quarto	Ex Quinto.	Ex Sexto.
5030. A. 31680. C.	26650. B. 6340. E. 31680. C. 11370. D.	44190. P. 106350. V. 37805. Q. 79635. T.
26650. B.	5030. A. 5030. A.	6385. E. 26715. B. *p* 6340. *pro* 26650.

Ex ſeptimo.	Ex octavo.	Ex nono.
117440. O. 79635. T.	26650. B. 6340. E. 106350. V. 44190. P.	73805. Q. 79635. T.
37805. Q.	79700. T. 37850. Q. *pro* 79635. *pro* 37805.	117440. O. 18. G. 0′. 117440. O. 31680. C. 11370. D. 5030. A. 72. 0. 5030. A. 26650. B. 3640. E.

Ex Decimo.	Ex Undecimo.	Ex Duodecimo.
5030. A. 5030. A. 26650. B. 6340. E.	26650. B. 6340. E. 79635. T. 37805. Q.	5030. A. 5030. A. 26650. B. 6340. E.
31680. C. 11370. D. 73805. Q. 79635. T. 44190. P. 106350. V.	106285. V. 44145. P. 6340. E. 26650. B. 44190. P. 106350. V.	31680. C. 11370. D. 37805. Q. 79635. T. 117440. O. 117440. O.
6385. E. 26715. B. *pro* 6340. *pro* 26650.	37850. Q. 79700. T.	79635. T. 37805. Q.

Ex decimo tertio.	Ex decimo quarto.
37805. Q. 79635. T. 117440. O. 117440. O.	26650. B. 6340. E. 31680. C. 11370. D.
79635. T. 37805. Q. 11370. D. 31680. C. 5030. A. 5030. A.	5030. A. 5030. A. 117440. O. 117440. O. 37805. Q. 79635. T.
6340. E. 26650. B.	79635. T. 37805. Q.

Ex decimo quinto.	Ex decimo ſexto.
26650. B. 6340. E.	26650. B. 6340. E.
79635. T. 37805. Q.	106350. V. 44190. P.
106285. V. 44145. P.	79700. T. 37850. Q.
6340. E. 26650. B.	11370. D. 31680. C.
11370. D. 31680. C.	6340. E. 26650. B.
5030. A. 5030. A.	5030. A. 5030. A.

Primi igitur octo caſus perficiuntur per operationem ſimplicem; reliqui octo per duplicem, in quibus ſcilicet ſemper aliquid aliud quaritur ante id, quod proponitur, per unũ ex octo prioribus.

Reſolvuntur itaq; 9. in 2. & 4. Sic 10. in 1. & 6. Sic 11. in 3. & 8. Sic 12. in 1. & 7. Sic 13. in 2. & 14. Sic 14. in 5. & 7. Sic 15. in 3. & 5. Sic 16. in 8. & 5.

Excerpſi autem ſtudio Logarithmos *rudes, ut ſi arcus propoſitus caderet medius inter duos expreſſos in Chiliade, medium etiam aliquid inter duos illorum* Logarithmos *eligerem, rotundo fine; ut monerem, etſi neq; arcus, neq; eorum* Logarithmi *in Chiliade Rotundi ſint, nihil tamen opus eſſe, ut Calculator ſeſe ubique maceret, minutias conſectando, quod equidem grave eſſet in hâc Chiliade: facilius aliquantò in Canone quadrantis; in quo arcus rotundi ſunt, & ſingula minuta ſuos habent* Logarithmos.

Aliud etiam Compendium nõ contemnendum (ut ad marginem monui) habet Canon præ meâ Chiliade, quod is arcuum Complementa cum ſuis Logarithmis *exhibet è regione. Itaque quod ego in Chiliade cogor circumloqui longius,* Logarithmum *ſcilicet Complementi arcus, lateris, baſis, vel anguli: id in Canone brevius exprimimus, Antilogarithmum arcus, lateris, baſis & anguli dicentes: ut innuamus excerpendũ eſſe Antilogarithmum è regione* Logarithmi.

Tertium

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Tertium compendium Canonis eſt in eo, quod is habet etiam Meſologarithmos, pro quos, caſus octo poſteriores fiunt ſimplices, qui ſunt hic duplices: verum hoc Canonis compendium apud inexercitatos conjunctum eſt cum diſpendio, quod diſtrahitur animus additionibus & ſubtractionibus Meſologarithmorum Coſſicis, hoc eſt, multitudine cautionum, quibus Arithmetica Coſſica conſtat.

Sed quod attinet Logarithmos, *paulò exactiores ex ipsâ etiam Chiliade excerpendos, ut etiam in hoc ſatisfiat curioſitati quorundam: tradam Cap. ſequenti 8. modum elaborandi* Logarithmum *cuiq; ſinui reſpondentem: Capite verò 9. modum alium ſubſidiarium, capiendi pro* Logarithmis *partem proportionalem vulgarem, idq; ſine labore, mediantibus aliis* Logarithmis.

Hactenus igitur de Triangulis Sphæricis Rectangulis egimus. Nunc ad Obliquangula tranſeamus.

DE TRIANGULIS OBLIQUANGULIS Sphæricis: in quibus Caſus ſunt 12.

I. Si dentur duo latera, & angulus uni oppoſitus: quæraturq; angulus alteri datorum laterum oppoſitus: ad Logarithmum *anguli, adde* Logarithmum *lateris dati, quæſito oppoſiti, à ſumma aufer* Logarithmum *lateris angulo dato oppoſiti, reſtabit* Logarithmus *anguli quæſiti, recto ſeu majoris, ſeu minoris.*

EXEMPLUM CASUS PRIMI, LOGARITHMIS rudibus ſeu rotundis.

In Triangulo P. V. S. *data ſunto latera duo* P. V. 38. G. 30′. V. S. 40. G. 0′. *Angulus* V. P. S. 31. G. 34′. *oppoſitus ipſi* V. S. *Quæritur angulus* V. S. P. *lateri* V. P. *oppoſitus.*

V. P. S.

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V.P.S. 31.G. 34′. *Logarith.* 64720.
V.P. 38. 30. *Logarith.* 47480.

Summa 112200.
V.S. 40.G. 0′. *Logarith.* 44190.*ſubt.*

Reſiduum 68010.*ut*
Logarithmus dat V.S.P.30.G.26′.*circiter.*

Hic ſitne ipſe quæſitus, an ejus reſiduum ad Semicirculum, facilè diſcerni poterit ex habitudine laterum, præſertim oppoſiti P.V. *Non eſt enim mei inſtituti minimas cautiones hâc vice conſectari.*

II. Si iiſdem datis, quæratur latus tertium: Tunc adde Logarithmos anguli dati, & lateris attigui dati, prodit Logarithmus perpendiculi dictus. Ejus perpendiculi Logarithmus complementi ablatus à datorum laterum Logarithmis complementi, relinquit Logarithmos duorum arcuum, quorum vel differentia, vel complementorum ſumma, eſt latus quæſitum tertium.

III. Si iiſdem datis, quæratur angulus inter latera data comprehenſus.

Tunc quæratur latus tertium, ut præcepto ſecundo horum. Ejus Logarithmo adde Logarithmum anguli dati, à ſummâ aufer Logarithmum lateris, cui datus angulus opponitur: reſtat Logarithmus anguli comprehenſi, ejusq; complementi ad duos rectos.

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EXEMPLUM II. ET III. CAſUUM.

Iiſdem datis, quæratur PS *&* PVS.



Logarith.

VS. 40. G. 0′. 44190. *Compl.* 50. G. 0′. *Log.* 26660
VPS. 31. 34. 64720.
VP. 38. 30. 47480. *Compl.* 51. 30. *Log.* 24510
VR. 19. 0. 112200. *Compl.* 71. 0. *Log.* 5600
SR. 35. 54. *Compl.* 54. 6. *Log.* 21060
PR. 34. 8. *Compl.* 55. 52. *Log.* 18910
SP. 70. 2. *Log.* 6190.
70910.
SVP. 49. 57. *log.* 26720.

Reſiduum hoc eſt, ſeu complementum anguli ad duos rectos, quòd facilè patet ex magnâ proportione PS *ad* PV, VS. *Quando verò dubitari poteſt, tunc quærenda ſunt ejus elementa* PVR, RVS.

IV. Si datis duobus lateribus & angulo comprehenſo, quæratur latus tertium.

Tunc ad Logarithmum lateris minoris, adde Logarithmum comprehenſi, prodit Logarithmus perpendiculi in latus majus, quod perpendiculum conſtituit duo illius lateris elementa: Hujus enim perpendiculi Logarithmus complemẽti ablatus à Logarith*mo complementi lateris minoris, dat* Logarith*mum arcus, cujus complementum eſt alterum ex illis elementis, eoq́; vel addi, vel auferri debet à toto latere majori, ſummæ vel reſidui, ut elementi alterius,* Logarith*mum complementi, adde* Logarith*mo complementi perpendiculi, fietq́;* Logarith*mus complementi lateris tertii quæſiti. Prior caſus eſt, quando angulus comprehenſus & datus obtuſus eſt, poſterior, quando acutus.*

V. Si

V. Si datis duobus lateribus & angulo comprehenſo quæratur angulorum reſiduorum unus.

Tunc quære latus tertium, ut in quarto præcepto horum. Ejus Logarithmum aufer à ſumma Logarithmorum anguli initio dati, & lateris angulo quæſito oppoſiti, reſtabit Logarithmus anguli quæſiti.

EXEMPLUM IV. ET V. CASUUM.

Dentur V P, P S *&* V P S, *quæratur* V S, *&* P V S.

				Logar.	Compl.		Logar.
	P V.	30. G.	30′.	47480.	51. G.	30′.	24510.
	V P S.	31.	34.	64720.			
Perpendiculum	V R.	19.	0.	112200.	71.	0.	5600.
Elementum unum	P R.	34.	8.		55.	52.	18910.
	P S.	70.	2.	6190.			
Elementum alterum	R S.	35.	54.		54.	6.	21070.
Quæſitum latus	V S.	40.	0.	44190.	50.	0.	26670.
Summa Log.	V P S.	& P S.		70910.			
Quæſit. angulus	P V S.	49.	57.	26720.			

VI. Si datis tribus lateribus quæritur angulus.

Tunc laterum circa quæſitum angulum exquire differentiam; illam à latere tertio aufer, eidemq́ adde, & tam reſidui quàm ſumma conſtitue ſemiſſes. Hâc præparatione præmiſſâ, jam excerpe quatuor Logarithmos, duos ſemiſſium, & duos laterum circa quæſitum angulum, ſummamq́ horum aufer à ſumma illorum: Differentiæ, quæ futura eſt, ſemiſſis, ut Logarithmus, oſtendet ſemiſſem anguli quæſiti.

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EXEMPLUM SEXTI CASUS.

Dentur V P, P S, S V. *quæratur* V P S.

V P. 38. G. 30′. *Log.* 47480.

P S. 70. 2. *Log.* 6190.

Diff. 31. 32. 53670. *Summa.*

V S. 40. 0.

Semiſſes

Reſiduum 8. 28. 4. 14. *Log.* 260400.

Summa 71. 32. 35. 46. *Log.* 53700.

314100. *Summa.*

260430. *Summar. diff.*

Quæſitus V P S. 31. 34. 15. 47. *Log.* 130215. *Semiſſis, quæratur.*

Quæratur P V S.

Logarithmi.

V P. 38. G. 30′. 47480.

V S. 40. 0. 44190.

1. 30. 91670.

P S. 70. 2.

Semiſſes

68. 32. 34. 16. 57440.

71. 32. 35. 46. 53700.

111140.

19470. *Summar. diff.*

Quæſitus P V S. 130. 14. 65. 7. 9735. *Dimid.*

Quæ-

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Quæratur PSV.

			Logarithmi.
SV.	40.G.0′.		44190.
PS.	70. 2.		6190.
	30. 2.		50380.
	38. 30.	*Semiſſes*	
	8. 28.	4.14.	260400.
	68. 32.	34.16.	57440.
			317840.
			267460. *Summar. diff.*
Quæſitus VSP.	30. 26.	15.13.	133730. *Dimidium.*

VII. Si datis duobus angulis, & latere alteri datorum ſubtenſo, quæratur latus reliquo ſubtenſum: Ad Logarithmum lateris dati, adde Logarithmũ anguli adjacentis dati, à ſummâ aufer Logarithmum anguli, lateri dato oppoſiti; reſtabit Logarithmus lateris quæſiti, ejusq́ complementi ad Semicirculum: ubi pro ratione quantitatis datorum, vel ipſe Logarithmi arcus, vel ejus complementum ad Semicirculum ſumendum eſt pro latere.

EXEMPLUM VII. CASUS.

Dentur PVS, VPS, VS, *quæratur* PS.

	Logarith.	ALIUD.	
VS. 40.G.0′.	44190.	*Latus* 40.G.0′.	44194.
PVS. 130. 3.	26720.	*Ang.* 30.	28.67917.
	70910.		112111.
VPS. 31.G.34′.	64720.	*Ang.* 80.G.0′.	1531.
Quæſitum VS. 70. 2.	6190.	*Lat.q̃ſ.* 19.G.19′.	110580.

V 3 *VIII. Si*

VIII. Si iiſdem datis quæratur Angulus tertius.

Tunc adde Logarithmos lateris dati, & anguli alterius adjacentis: prodit Logarithmus perpendiculi ex angulo quæſito demiſſi: cujus Logarithmus complementi, ablatus à datorum angulorum Logarithmis complementi, relinquit Logarithmos duorum elementorum anguli quæſiti, à perpendiculo conſtitutorum: quorum ideò vel ſumma conſtituit quæſitum, ſi perpendiculum cadit intra Triangulum, vel differentia, ſi extra.

IX. Si iiſdem datis, quæratur latus interjectum datis angulis.

Tunc quæratur angulus tertius, ut præcepto VIII. horum. Ejus Logarithmo adde Logarithmum lateris dati; à ſumma aufer Logarithmum anguli, qui lateri illi dato opponitur, reſtabit Logarithmus lateris interjecti.

EXEMPLUM VIII. ET IX. CASUUM.

Dentur PVS, VPS, VS, *quæratur* VSP & VP.

		Logarithmi.	*Compl. Logar.*
VS.	40. G. 0'.	44190.	
PVS.	130. 3.	26720.	40. G. 3'. 44080.
Perpendic. ex angulo S.	29. 29.	70910.	60. 31. 13870.
VPS.	31. 34.		58. 26. 16000.
Elementum unum			47. 40. 30210.
Elementum alterum			78. 14. 2130.
VSP. *Quæſitus*			30. 34. *per ſubtractionem.*

NOTA.

VSP. 30. G. 34'.	67630.	*Arcus* 130. G. 3'. & 49. 57. } *Logarithmus eſt idem.*
	111820.	
VPS.	64720.	*At* 40. 3. *eſt minoris quadrante complementum; majoris quadrante Exceſſus.*
Quæſitus VP. 38. 37.	47100.	

ALIUD.

ALIUD EXEMPLUM.

			Logarith.	Compl.		
Latus	40.G.	0'.	44194.	G.	'.	Logarith.
Ang. adjac.	30.	28.	67917.	59.	32.	14859.
Perpendic. ex angulo	19.	1.	112111.	70.	59.	5613.
Ang. alter. lateri oppoſ.	80.	0.	1531.	10.	0.	175072.
	Elementum unum			56.	$44\frac{1}{2}$	99247.
	Elementum alterum			10.	35.	169470.
	Ang. quæſitus			76.	19. *per addit.*	
Angulus tertius	76.G.	19'.	2879.			
			47073.			
Latus quæſitum angulo tertio quæſito oppoſitum.	39.	22.	45542.			

X. Si datis duobus angulis & latere interjecto, quæratur angulus tertius, lateri dato oppoſitus. Tunc ad Logarithmum *angulus minoris, adde* Logarithmum *lateris interjecti, prodit* Logarithmus *perpendiculi ex majori angulo; cujus perpendiculi* Logarithmus *complementi & aſſervari debet, & auferri ab anguli illius ejuſdem* Logarithmo *complementi, relinquetur* Logarithmus *unius elementi illius anguli, unde perpendiculum eſt demiſſum. Hoc igitur ablatum ab angulo ipſo toto, vel ille ab hoc, relinquit ejus elementum alterum.*

Huius iterum Logarithmus *addatur* Logarithmo *aſſervato, ita fiet* Logarithmus *complementi anguli tertii quæſiti, vel ejus exceſſus ſupra Quadrantem.*

Si datorum angulorum alter eſt major quadrante, latus datum minus eſſe debet Quadrante.

Si latus datum eſt quadrante majus, tunc elementum anguli, quod illi reſpondet, eſt etiam quadrante majus, & ſic Triangulum obtuſangulum, ubi perpendicularis cadit extra.

XI. Si datis duobus angulis, & latere interjecto, quæratur laterum reſiduorum unum: Tunc quære angulum tertium, ut in præcepto 10. horum, ejus Logarithmum aufer à ſumma Logarithmorum lateris initiò dati, & anguli lateri quæſito oppoſiti, reſtabit. Logarithmus lateris quæſiti.

EXEMPLUM X. ET XI. CASUUM.

Dentur PVS, VPS, VP, *quæratur* VSP, & VS.

Logar. Compl.

Ang.tot. PVS. 130. G. 3'. 26720. 40. G. 3'. *Log.*
VPS. 31. 34. 64720. 58. 26. 16000.
VP. 38. 30. 47480.

Perpendic. ex V. 19. 1. 112200. 70. 59. 5610. *Aſſervãdus.*

Vnius elementi ang. 64. 23. 64. 23. 10390.

Alterũ elementũ ang. 65. 40. 9300.
5610. *aſſervatus.*

59. 29. 14910.
Quæſitus VSP. 30. 31. 67780.

Quæſitum VS. 39. 54. 44420.

XII. Si datis tribus Sphærici angulis, quæratur laterum aliquod.

Tunc primũ pro angulo maximo ſcribe & uſurpa ejus complementum ad Semicirculum, deinde angulorum latus quæſitum attingentium exquira differentiam: illam ab angulo tertio aufer, eidemq́ adde, & tam reſidui quàm ſummæ conſtitue ſemiſſes.

Horum

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Horum Logarithmos adde in unam ſummam, à quâ aufer ſummam Logarithmorum duorum angulorum latus attingentium: reſidui ſemiſſis, ut Logarithmus, dat ſemiſſem lateris quæſiti ex columnâ arcuum; Excipe caſum unum, ſi nimirum in Acutangulo, Triangulo, latus quæſitum, ſubtenſum fuerit angulorum maximo: tunc operatione per ejus complementum ad Semicirculum peractâ, ut prius, prodit ſemiſſis, non ipſius lateris quæſiti, ſed ejus itidem complementi ad Semicirculum.

At in Obtuſangulo, etiamſi latus quæſitum ſubtenſum fuerit obtuſo, & ſic maximo, valet nihilominus regula generalis, proditq́; ſemiſſis lateris quæſiti ipſius.

EXEMPLUM XII. CASUS.

Dentur anguli PVS, VSP, SPV, *quæratur* PS.

				Logarithmi.
	VSP. 30. G. 28′.			67910.
	VPS. 31. 34.			64720.
Differentia	1. 6.			132630. *Summa.*
Complementum ad Semicirc.	PVS. 49. 57.		*Semiſs.*	
Differentia	48.	51. 24. 25. $\frac{1}{2}$		88309.
Summa	51.	3. 25. 31 $\frac{1}{2}$		84187.
				172496. *Summa.*
				39866. *Diff. ſum.*
Quæſitum	PS. 70.	0. 35.	0.	19933. *Semiſs.*

Quæratur PV.

	PVS.	130. G.	3′.			*Logarithmi.*
Compl. ad Semicirc.		49.	57.			26725.
	VPS.	31.	34.			64724.
		18.	23.			91449.
	VSP.	30.	28.	*Semiſſes.*		
		12.	5.	6.	$2\frac{1}{2}$	225142.
		48.	51.	24.	$25\frac{1}{2}$.	88309.
						313451.
						222002.
Quæſitum	VP.	38.	29.	19.	$14\frac{1}{2}$.	111001.

Quæratur VS.

	PVS.	130. G.	3′.			*Logarithmi.*
Compl. ad Semicirc.		49.	57.			26725.
	VSP.	30.	28.			67917.
		19.	29.			94642.
	VPS.	31.	34.	*Semiſſes.*		
		12.	5.	6.	$2\frac{1}{2}$	225142.
		51.	3.	25.	$31\frac{1}{2}$.	84187.
						309329.
						214687.
Quæſitum	VS.	39.	57.	19.	$58\frac{1}{2}$.	107343.

ALIUD.

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ALIUD EXEMPLUM.

Sint Anguli circa latus quæſitum.

	30.G.	28′.			67917.
	76.	19.			2879.
Differentia	45.	51.			70796. *Summa.*
Ang. oppoſ.	80.	0. *Maximus trium*			
Compl. ad Semicirc.	100.	0.			
	54.	9.	27.G.	$4\frac{1'}{2}$	78712.
	145.	51.	72.	$55\frac{1}{2}$	4508.
					83220. *Summa.*
					12424. *Diff. ſum.*
	140.	2.	70.	1.	6212. *Semiſſis.*
Quæſitus	39.	58.			

Viciſſim ſint anguli circa quæſitum hi:

					Logarithmi.
Maximus trium	80. G.	0′. }			1531.
Compl. ad Semicirc.	100.	0. }			
Alter	76.	19.			2879.
Differentia	23.	41.			4410. *Summa.*
Tertius	30.	28. *Semiſſes.*			
Differentia	6.	47.	3.	$23'\frac{1}{2}$	282750.
Summa	54.	9.	27.	$4\frac{1}{2}$	78712.
					361462 *Summa.*
					357052. *Diff. ſum.*
Quæſitum latus	19.	19.	9.	$39\frac{1}{2}$	178526. *Semiſs.*

Atque hæc de obliquangulis, & in univerſum de Sphæricæ ſuperficiei Triangulis curvilineis, quæ formantur arcubus Circulorum maximorum.

De Rectilineis verò Triangulis, ſeu quæ formantur in ſuperficiei planâ, capite Nono agetur.

CAPUT VIII.

De copulatione columnæ Sinuum, ſeu Numerorum Abſolutorum, & columnæ Logarithmorum.

PRÆCEPTUM I.

Logarithmum excerpere accuratum Numeri ſcrupuloſi propoſiti.

ETſi rariſſimè eſt opus tantâ ſcrupuloſitate, quoties tamen eſt opus, Fit per Prop. 27. Corollarium 3. in hunc modum.

Propoſiti Numeri ſcrupuloſi exceſſum ſuper Rotundum Chiliadis proximè minorem, continua, appoſitis verſus dextram ſeptem Cyphris; ſic continuatum divide per hunc ipſum proximè minorem, elaboratum tamen prius ſeu continuatum per unam inſuper vel duas figuras ſcrupuloſas, quæ contineant dimidium duarum primarum figurarum exceſſus, vel aliquid proximè minus dimidio: Quotientem aufer à Logarithmo ad dictum rotundum proximè minorem, reſtabit Logarithmus propoſiti ſcrupuloſi.

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EXEMPLUM.

Propoſitus eſto ſcrupuloſus 23456.78.

Chilias exhibet ad rotundum proximè minorem 23400.00. *Log.* 145243.42.

Igitur exceſſus ſcrupuloſi eſt 56.78. — 242.36. *Quotiens auferatur.*

145001.66. *Hic eſt Logarith. quæſitus accuratius.*

Ei apponantur 7 Cyphræ 567800000000.

Hunc divide per inventum Rotundum Chiliadis proximi minorem. 2340000.

Sed elaboratum per duas figuras ſignificativas, quæ ſint dimidium de 56. primis duabus figuris in exceſſu ſcilicet per 28. Vt 2342800.

Diviſio compendioſa.

56780	
23428	
46856	2.
9924	
9371	4.
553	
469	2.
84	
70	3.
14	
14	6.

ALIUD EXEMPLUM.

Sin. gr. 81. Scrupuloſus 987 | 68.83 $\frac{2}{5}$ *Log.*

Minor Chiliadis 987 | 00.00. 1308.52.

Exceſſus appoſitis Cyphris 6883400000

Diviſor

6883400000	
98734 00	6.
592404	
959360	
888606	9.
707540	
691138	7.
164020	
197468.	2. *Quotiens.*

Logarith. 1308. 52.

Quotiens. 69. 72.

1238. 80. *quæſitus.*

Hîc prodeunt tantum quatuor figuræ.

X 3 ALIUD.

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ALIUD EXEMPLUM.

Sit Sinus Gr.9.	15643.45.		
Rotundi ergò	15600.00.	*Log.*	185789.93.
Exceſſus	43.45.		278,15. *Quotiens ſubt.*
Diviſor	15621		185511.78. *Log. quæſitus.*
	31242	2.	
	12208		
	109347	7.	
	127330		
	124960	8.	
	23620		
	15621	1	
	80000	5.	

CAUTIO.

Raro uſu venit, ut opus nobis ſit Logarithmo tam ſcrupuloſo & accurato: plerunque ſufficit Logarithmus Rotundus, cui non ſint plures à ſiniſtris figuræ ſignificantes, quàm in quot figuris Logarithmi bini Chiliadis, proximi invicem, nihil inter ſe differunt, unâ plus.

Vt quia Logarithmus ad 23400.00. *eſt* 1452.	43.40.
Sed Logarithmus ad 23500.00. *eſt* 1448.	16.97.
Sufficit igitur Logarithmus Rotundus 1450.	00.00.

Quia 1450. *eſt medium inter* 1452. *&* 1448.

CAUTIO ALIA.

Si vero omninò eſſet opus Logarithmo accuratione, tunc

ſcito,

ſcito, quod in Logarithmis valdè magnis, ad numeros parvos Chiliadis, diviſor debeat eſſe viciniſſimus medio Geometrico, inter numerum datum ſcrupuloſum, & inter proximè eo minorem Chiliadis: paulò tamen major medio Geometrico: ut docet allegata Propoſitio.

Exempli Causa.

Si quæratur Logarithmus numeri 150.00. *Hic numerus ſcrupuloſus eſt, quia cadit inter duos Chiliadis proximos, ſcilicet inter* 100.00. *&* 200.00. *Exceſſus eſt* 50.00. *Si hunc divideres per* 12500. *quod eſt inter* 15000. *datum ſcrupuloſum, & inter datum proximè minorem* 10000. *medium Arithmeticum, prodiret quotiens* 40000.00. *auferendus à* 690775.54. *reſtaretq;* 650775.54. *Sin autem dividas per* 12000. *Geometricum medium inter* 15000. *&* 10000. *quotiens erit* 41666.67. *qui ablatus à Logarithmo proximè minoris ſcilicet à* 690775.54. *relinquit* 649108.87. *quaſi Logarithmum ad propoſitum abſolutum ſeu Sinum* 125.00.

Quod verò Logarithmus iſte ſit jam minor juſto, ſic patet per uſum præcepti ſequentis.

Pro 150.00. *ſume centuplum* 15000.00. *ejusq; Logarithmum* 189712.00. *adde Logarithmo centuplicationis* 460517.03. *Sic colligitur Logarithmus Numeri* 150.00. *ſcilicet* 650229.03.

Quare Quotiens 4166667. *quam ſubtrahebamus, erat major juſto, ac proinde medium proportionale inter ſcrupuloſum, & Chiliadis proximè minorem ſcilicet* 120.00. *erat diviſor minor juſto.*

Alia

ALIA EXEMPLARIS OBSERVATIO, Pro ſcrupuloſorum magnorum Logarithmis accuratis indagandis.

Sit numerus Scrupuloſus	
Seu Sinus Gr. 81.	98768. 834. *Log. accuratus eſt* 1238. 80.
Sagitta	1231. 166.
Secantis complementi (9. G.) *Exc.*	1246. 513.
Summa	2477. 679.
Horum med. Arithmeticum.	1238. 840.
Differentia medii arith. & ſagitt.	7. 673.
Adde ad ſagittam fit	1238. 839. *Logarithmus ferè: qui dif-*
Vel differentia Exceſs. & ſag.	15. 347. *fert à Logarithmo accurato*
Ejus dimidium.	7. 673. *Solis* 4. *unitatibus loco ſe-*

cundo poſt punctum, ſcilicet quia Logarithmus eſt adhuc parvus.

Sic per complementum ſcrupuloſi parvum.

Sin. Gr. 84. 16′. 99499. 762.

Chiliadis numerus major 99500. 000. *dat Log.* 501. 25.

Complementum ſcrupuloſi parvum	238000000	24. *Quotientē adde*
		501. 49. *Log.*
Diviſor	9950000	2/4. *Quotiens*

Hîc Sagitta	500. 238.
& Exceſs. ſecantis in Canone	502. 753.
Faciunt ſummam	1002. 991.
Dimidium	501. 496. *Paulò majus eſt Logarithmo accurato.*

Vide ſuper hac re etiam Prop. XXII. *Corollaria & præcepta, fol.* 31.

Ut

Ut compendioſè excerpas Logarithmos Numerorum quorundam ſcrupuloſorum, ſcilicet ſine Diviſione.

Casus Primus.

Si propoſitus numerus ſcrupuloſus fuerit minor quàm 10000.00. *minor ſcilicet quàm decima pars Maximi in Chiliade: ſic ut Logarithmus ejus ſit valdè magnus, & differentiæ Logarithmorum circa illa loca non magnæ tantùm, ſed inſuper etiam notabilibus incrementis creſcentes. Tunc Logarithmo propoſiti decupli (qui facilius elaboratur) adde Logarithmum decuplicationis, vel Logarithmo centupli, Logarithmum centuplationis, &c. ita habetur Logarithmus propoſiti Numeri.*

Exemplum.

Propoſitus eſto ſcrupuloſus 2345.68. *hic cùm ſit minor quàm* 10000.00. *Ergò quære Logarithmum ejus decupli ſc.* 23456.80. *Is autem invenitur ſuperiori Methodo* 145001.00. *Huic igitur adde Logarithmum decuplationis* 230258.51.

Summa 375259.51. *eſt Log. quæſitus Numeri* 2345.68.

Aliud Exemplum.

Propoſitus eſto Numerus ſcrupuloſus 175.00. *ut ejus Logarithmus exactus habeatur: quære centupli* 17500.00. *Logarithmum, qui eſt* 174296.93. *Et pro appoſitis* 00. *adde centuplat.* 460517.03.

Emergit Numeri 175.00. *Log.* 634813.96.

Aliud Exemplum.

Sinus unius Minuti ſolet exprimi hoc numero 29.09. *quæritur hujus numeri Logarithmus.*

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Scribe millecuplum 29090.00.
Hoc proximè minor invenitur 29000.00.*Log.*123787.43.

Exceſſus 90.00. *Hic continuatus ſeptem Cyphris, & diviſus per* 29045.00.*medium Arithmeticum inter datum & excerptum: ſeu ille continuatus* 5.*Cyphris, & diviſus per* 29045. *dat quotientem* 309.87. *qui ablatus ab exſcripto Logariſhmo, relinquit Logarithmum millecupli* 123477.56.
Huic igitur adde Millecuplatorem 690775.54.

Provenit Logarithmus quæſitus 814253.10.

Quod ſi numerus 29.09.*exactè exprimeret Sinum unius Minuti, tunc hic etiam exactus eſſet Logarithmus unius Minuti: at quia in* 29.09.*ultima unitas non eſt omninò plena, ideò etiam Logarithmus unius Minuti eſt paulò major: ut quidem Vrſinus eum exprimit ſic* 814257.

Casus Secundus.

Idem ferè proceſſus eſt, ſi datus ſcrupuloſus fuerit major quidem quàm 10000.00.*parvus tamen etiamnum & minor quàm maximus Chiliadis. Tunc enim Logarithmo dupli, vel tripli, vel quadrupli (quod quidem non excedat maximum Chiliadis) additur* Logarithmus *totuplans.*

Vt ſi detur Numerus ſcrupuloſus 23456.78.

Hic etſi major eſt quàm 10000.00.*eſt adhuc tam parvus, ut ejus quadruplus ſcilicet* 93827.12.*ſit adhuc minor maximo Chliadis. Quæratur igitur hujus* Logarithmus:

Ad

Ad 93800.00. *eſt* Log. 6400. 53.

Appendix ſcru-pulosa 27.12. *Aufert* 28. 82. *Quotiens auferend.*

1386 29.44. *Log. 4druplans add.*

Hæc dividitur per 938135. | 145001. 15. *Logarithmus quaſitus.*

18.76270. | 2

8357300

7505080 | 8

852220

835730 | 8

16490 | 2

Hic caſus generaliter proponi poteſt, ut circumſpicias, in quâ proportione (terminorum quidem Rotundorum) ſit numerus propoſitus ad aliquem proximè minorem maximo Chiliadis. Tunc conſtituitur proportionis illius Logarithmus, *& per eum augetur* Logarithmus *illius proximè minoris.*

Sit Sinus quicunque, puta 15643. 45. *hic continetur in* 100000.00. *ſexies, ſextuplum enim eſt* 93860.70. *Huc poteſt accedere triens* 5214. 48. *& conficitur* 99075.18. *Eſt igitur* 15643.45. *ad* 99075. 18. *ut* 19. *ad* 3. Logarithmus *Novemdecupli eſt* 299443.90. *Hinc aufer triplicantem* 109861. 23. Logarithmus *igitur proportionis eſt* 189582.67.

Quare Logarithmus *illius multiplicis proximè minoris Maximo Chiliadis per diviſionem elaboratus eſt iſte:*

Exc.	7518000000		99075.18.	1005.03.
Div.	9903700000		99000.00.	75.91. *Quotiens.*
	693259	7.	*Exc.* 75.18.	929.12.
				184582.67.
	385410			
	495185	5.	*Adde Log. ꝓpor.* 185511.79.	
	902250		*Log. quæſitus Numeri abſoluti* 15643.45.	
	891333	9.		
	10917	1.	*Quotiens.*	

CASUS TERTIUS.

Si ſcrupuloſus, minor quàm 50000.00. *habuerit non plures quàm* 4. *figuras ſignificativas, earumq́; ultima fuerit quinarius.*

Tunc dupli vel quadrupli Logarithmo in Chiliade invento, adde Logarithmum duplicantem, vel quadruplicantem.

EXEMPLA.

Vt ſi datus ſit numerus ſcrupuloſus 49950.00. *minor ſcilicet quàm* 50000.00. *ejus dupli* 99900.00. *Logarithmo* 100.05. *adde Logarithmum duplicationis* 69314.72. *fit* 69414.77. *Logarithmus quæſitus.*

ALIUD.

Suprà caſu primo quærendus fuit Logarithmus ad Numerum 17500.00. *propter ſcilicet ejus centeſimæ* 175.00. *Logarithmum indagandum. Hic ſi non poſitus eſſet in ipsâ Chiliade, poſſet ſic inveſtigari.*

Duplum eſt 35000.00. *quadruplum* 70000.00. *Hujus verò Logarithmus eſt* 35667.49. *Huic adde Logarithmum Quadruplatorem* 138629.44.

Prodit qui ſupra. 174296.93.

CASUS

CASUS QUARTUS.

Si datus ſcrupuloſus, duplicatus continuè, tandem ſortiatur non plures figuras ſignificativas, quàm tres primas à ſiniſtris, ſed tunc exceſſerit maximum Chiliadis, tum Logarithmo partis 10. *vel* 100. *de hoc ſic multiplicato, adde Logarithmum duplicationis vel quadruplicationis, &c. à ſummâ aufer Logarithmum decuplationis vel centuplationis, &c.*

Ut ſi proponatur Numerus ſcrupuloſus 51250.00.
Hujus duplus eſt 102500.00.
Et hujus duplus eſt 205000.00. *habens ſignificativas figuras non ultra tres.*

Hic verò jam eſt major quàm 100000.00. *Ergò ejus partis decimæ* 20500.00. *Logarithmo* 158474.53. *adde Logarithmum quadruplicantem hoc loco* 138629.44. *Et aufer Logarithmum decuplantem hoc loco* 230258.51. *Reſtat Numeri* 51250.00. *Logarith.* 66845.46.

Potuit etiam ſumi duplus ipſius 205. *&c. ſcilicet* 410. *&c. & rurſum hujus duplus* 820. *&c. hujus* Log. 19845.09.
Adde ſedecuplatorem 277258.88.
297103.97.
Et aufer decuplatorem 230258.51.
Reſtat idem quod prius 66845.46.

CASUS QUINTUS.

Si datus ſcrupuloſus habuerit partem aliquotam, quæ ſolas tres figuras à ſiniſtris habeat ſignificativas: Tunc Logarithmo *illius partis aufer* Logarithmum *totuplantem.*

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Vt ſi proponatur Numerus 19980.00. *ſcrupuloſus.*

Hujus ſemiſſis eſt 9990.00. *Hujus numeri Logarithmus per præceptum primi caſus invenitur ſic:*

Decupli 99900.00. *Logarith. eſt*	100.05.
Huic adde Logarithmum decuplationis	230258. 51.
Ita fit Log. 9990.00. *partis dimidiæ*	230358. 56.
Hinc aufer Logarithmum duplationis	69314.72.
Reſtat Log. numeri 19980.00. *quæſitus*	161043. 84.

PRÆCEPTUM II.

Dato Numero abſoluto, qui excedit maximum Chiliadis (ut ſunt ſecantes arcuum) invenire ejus Logarithmum.

Excedentis dati conſtitue partem aliquotam, quæ non excedat, puta decimam, centeſimam, milleſimam, &c. vel etiam dimidiam, tertiam, quartam, per Caſ. II. præced.

Ejus partis in Chiliade quæſitæ Logarithmus, auferatur à Logarithmo totuplationis (ut Decuplationis, Centuplationis, Millecuplationis, vel etiam Duplationis, Triplationis, Quadruplationis) reſtabitq́; Logarithmus excedentis privativus.

Vt ſi quæratur Logarithmus numeri 102400. 00. *Hic numerus habet loca octo, cum Chiliadis maximus* 100000. 00. *habens loca itidem octo, ſit tamen minor. Quare ſumatur numeri dati pars decima* 10240. 00. *utpote quæ jam ſit minor maximo Chiliadis. Hic numerus cùm jam ſit in quarto loco ſcrupuloſus, Logarithmum exactum non invenit in Chiliade, quare per præcept. præcedens elaborandus eſt ejus Logarithmus ſic:*

Nume-

Numerus 10240.00.

In Chil.prox.mino. 10200.00. *habens Log.* 228278. 25.

Exceſ.noſtri prolong.	40.000000000	
Diviſor eſt	1022 000	
Medium ſcil.	3066	3.
Arithmeticum inter		
datum, & proximè	9340	
minorem Chiliadis.	9198	9.
	1420	
	1022	1.
	3980	
	3066	3.
	9140	
	9108	9.

Quotiens 391. 39. *Subt.*

227886.86. *Hic eſt Logarithmus partis decimæ: qui ablatus à Logarithmo* 230258. 51. *decuplationis, relinquit Logarithmum* 2371. 65. *privativum ſigno* —, *Numeri ſcilicet dati excedentis* 102400.00.

In hoc exemplo, quia pars decima numeri propoſiti fuit ſcrupuloſa, præſtabat nos uti præcepti prioris caſu V.

Ecc. Numeri 102400.00. *propoſiti.*

Semiſſis 51200.00. *rotundus, habet* Log. 66943.07. *Subt.*

Logarithmus *duplicationis eſt* 69314.72.

Reſtat quod prius 2371.65.

In genere, ſi fuerint tres numeri continuè proportionales, eorumq́; Medius idem, qui & Maximus Chiliadis; tunc excedens maximum hunc Chiliadis Logarithmum *habet eundem cum minimo trium, ſed privativum, ſigno — præponendo, ne videatur nihil aliud ſignificare, quàm defectum in figurâ ultimâ, ut Cap. I.*

Vt ſi ſit 80000.00. *ad* 100000. 00. *ut hic ad* 125000. 00.

Quia

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Quia igitur numeri 80000.00. *Logarithmus eſt* 22314.36. *poſitivus, erit ergò & Numeri* 125000. 00. *Logarithmus* 22314.36. *ſed Privativus.*

Aliter & facilitate inopinabili.

A dato Numero excedente rejice tres ultimas figuras ad dextram. Sic curtatum quære inter Logarithmorum *differentias interlineares: &* Logarithmum *ipſum ei differentiæ proximum, planeq́ reſpondentem exſcribe; Erit enim hic ipſe* Logarithmus *Numeri propoſiti excedentis, ſed Privativus.*

Ut ſi quæratur, quis ſit Logarithmus *intervalli Martis & Solis* 152500. *ſeu prolongati* 152500.00. *ut ſit intervallum Solis & Terræ mediocre* 100000.00. *deletis ergò tribus ultimis reſtat* 152.50. *Huic verò numero proximus invenitur inter* Logarithmorum *incrementa interlinearia iſte* 152.55. *habens ante ſe* Logarithmum 42312. 00. *poſt ſe* 42159. 45. *ut ſic ipſi differentiæ* 152. 55. *intermediæ, reſpondeat etiam intermedius* 42230.00. *circiter. Hic igitur eſt Numeri* 152500. 00. Logarithmus *Privativus.*

ADMONITIO DE SECANTIBUS.

Atque hinc apparet, etiam ſecantes ipſos Arcuum complementorum quodammodo haberi per differentias Logarithmorum, *ad illos arcus, prolongatas tribus locis, quod ſuprà Cap.* 11. *promiſi me indicatorum.*

ADMONITIO ALIA.

Hic poteſt vicem Chiliadis implere, Canonis Neperiani columna Media, Meſologarithmorum, juncto Canone Tangentum in hunc modum.

Datum numerum excedentem quære inter Tangentes, & nota ejus arcum in gradibus & ſcrupulis: cum hoc excerpe ex Canone

none Meſologarithmorum, Meſologarithmum privativum, habebis ſic excedentis Logarithmum privativum.

PRÆCEPTUM III.

Dato Logarithmo, qui non exactè reperiatur in Chiliade, aſſignare Numerum Abſolutum juſtum cum ſcrupuloſitate ſuâ, ſicubi eâ ſit opus.

Dato Logarithmo proximè majorem exſcribe ex Chiliade, cum Numero abſoluto Rotundo reſpondente, factâq; ſubtractione dati ab exſcripto, reſiduum duc in abſolutum exſcriptum ut multiplicantem, factus, abſectis ſeptem ultimis ad dextram locis, collocetur loco quatuor Cyphrarum exſcripti Abſoluti: Ita prodit quam proximè juſtus Abſolutus, dato Logarithmo competens. Sed quia ei adhuc deeſt aliquid, corrigetur ſic, ſi facti curtati dimidium colloces loco ultimarum Cyphrarum Multiplicantis, & multiplicationem repetas.

EXEMPLUM.

Datus eſto Log. 145001.10. *Subtr.*
Hoc prox. major
Chiliadis Log. 145243.42. *Ei reſp. abſol.* 23400.00.

Reſiduum 242.32.
Duc in Abſ. exſcript. 234.00.00.

4846	4
726	96
96	92 80000.

Factus abſectis 7. ultimis 5670 | *Hic eſſet addendus ad exſcriptum Abſolutum, fieretq;* 23456.70. *Sed quia pars addenda nondum eſt perfecta; ideò dimidium ejus* 2835. *appono ad Multipli-*

cantem, ut fiat 2342835. *repetoq́; multiplicationem ſic:*

```
242.32
2342835.
———————————
48464|4
 726|96
  96|928
   4|8464
   1|93856
    |72696
    |121160
———————————
Factus 5677
correctior.
```

Compendioſè ſic, quia ultimi 35. *parum aut nihil efficiunt.*

```
242.32.
23428.
——————————
4846|4.
 727|0.
  96|9.
   4|8.
   1|9.
    |1.
——————————
5677|
```

Facilè autem videbit exercitatus calculator, non totum ſibi multiplicationem eſſe repetendum, ſed multiplicatione per anteriores figuras Multiplicantis peractâ, & ſummâ conſtituta, jam id quod per figuras anteriores ſemiſſis de emergente facto, fit, tantummodò ſubjiciendum eſſe decenter facto priori, in hunc modum.

```
24234
234
——————————
4846|4
 727|0
  96|9
——————————
5670|3
——
28. 4|8
    1|9
——————————
5677|
```

Hoc igitur correctiori facto appoſito ad primo exſcriptum 23400.00.

Fit abſolutus juſtus 23456.77.

CAU-

CAUTIO.

In Logarithmis valdè magnis, non eſt accuratiſſima hæc ratio: id tamen, quod peccatur, utcunq; magnum, in Logarithmis magnis, non efficit tamen ſenſibile quippiam in iis, quorum cauſâ ſunt Logarithmi.

ALIA ADMONITIO.

Plerunq; non eſt nobis opus ſcrupuloſitate numeri quæſiti: ſic ut ſufficiat exſcribere aliquem Abſolutum medium inter duorum circumſtantium Logarithmorum Abſolutos. Et tunc etiam ſufficit ſcribere tam Numeros, quàm Logarithmos uſque ad punctum; quod quidem punctum huic ipſi compendio ſervit.

PRÆCEPTUM IV.

Dato Numeri Logarithmo Privativo, invenire Numerum.

Privativum datum aufer à Multiplicatore aliquo majore, ut à Decuplatore vel Centuplatore, &c. vel etiam à Duplicante, Triplicante, &c. cùm reſiduo quære Numerum in Chiliade, qui erit quæſiti pars decima vel centeſima, &c. vel etiam dimidia, tertia, &c.

Vt ſi detur Logarithmus —2371.65. *privativus: ut ſcias quis ei reſpondeat numerus: aufer eum à Logarithmo decuplationis* 230258.51. *quippe qui iam eſt illo maior, reſtabit* 227886.86. *Hic indicat in Chiliade Numerum* 10240.00. *qui erit pars decima quæſiti: quare quæſitus ipſe erit* 102400.00. *ferè.*

Vel aufer datum privativum à 69314.72. *duplicationis Logarithmo, quia etiam hic jam eſt major dato privativo, reſtabit* 66943.07. *qui oſtendit in Chiliade* 51200.00. *qui eſt pars dimidia quæſiti: quare ipſe quæſitus eſt* 102400.00.

Aliter & facilitate inopinabili.

Privativum datum quære inter Logarithmos Chiliadis, & incrementum duorum proximorum, illi reſpondens, exſcriptum, auge tribus figuris ad dextram, ſic formatus erit Numerus Logarithmi dati quæſitus.

Vt ſi datus ſit idem, qui prius 2371. 65. *Hic inter Logarithmos quæſitus, cadit medius inter* 2429. 27. *&* 2326. 86. *& differentia horum, itidem media, eſt* 102. 41. *Hanc auge tribus locis, fiet* 102410.00. *Numerus reſpondens, ferè.*

ADMONITIO.

Atq; hîc iterum vicem Chiliadis ſupplet ex Canone Logarithmorum Quadrantis, columna Media Meſologarithmorum. Quæſitus enim in eâ Logarithmus excerpat arcum, gradus ſcilicet in calce (quippe cum ſit privativus) minuta in margine dextro. Hic arcus tranſlatus in Canonem Sinuum & Tangentum, oſtendit inter Tangentes Numerum quæſitum.

PRÆCEPTUM V.

De uſu Differentiarum interlinearium.

Etſi incrementa Logarithmorum Chiliadis, reſpiciunt (intra eam) ſolos Numeros abſolutos, ad latus poſitos, eorumq; Logarithmos, inter quos ſunt inſerta: ſciendum tamen eſt, illa eadem, eodem ordine à primo Chiliadis ipſius (diſſimulato jam ejus veſtibulo) ſervire cuicunq; alii Tabulæ conſtruendæ, quæ alios numeros (progreſſione tamen Arithmeticâ æquabili ſurgentes) alios etiam eorum Logarithmos habuerit, dummodò pauciores mille fuerint.

Verbi causâ, ſi pro Numero maximo 100000. 00. *placeat ſtatuere maximum* 60′. 0″. *& hujus partes facere* 720. *ſic ut una pars ſit* 0′. 5″. *pro eo quod in Chiliade eſt* 100.00. *Logarithmus in*

Chi-

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Chiliade ad numerum 720. eſt 32850.41. Hunc aufer à Logarithmo ad 100.00. ſcilicet 690775.57. reſiduus erit Logarithmus ad 0′.5″. novæ Tabulæ, ſcilicet 657925.13. Quod ſi jam ſubtraxeris ordine omnia incrementa (ſeu potius decrementa) Logarithmica Chiliadis ipſius (excluſo jam ejus veſtibulo) orſus à primo 69314.72. uſq; ad ultimum ex 720. ſcilicet 138.98. conſtituti erunt Logarithmi ad omnes partium novarum collectiones, puta ad 0′.10″. & 0′.15″. &c. Idem fiet, ſi unum & eundem Logarithmum, qui eſt ad numerum 720. ſeu 72000.00. ſubtraxeris ab omnibus & ſingulis 720. Logarithmis, ordine invicem ſuccedentibus in Chiliade.

ALIUD EXEMPLUM.

Si quis in ſubſidium rei Monetariæ vellet conſtruere Tabulam, cujus maximus numerus ſit una Marca, hoc eſt 16. Unciæ, hoc eſt 256. oboli; Logarithmus ad abſolutum 25600.00. Chiliadis ſcilicet 136257.79. ablatus à Logarithmo primo Chiliadis
ſcilicet 690775.54. *relinquit Logarithmum unius oboli ſcilicet* 554517.75. *Ab hoc Logarithmo ablata prima 256. incrementa Logarithmica Chiliadis, quorum primum ſit 69314.72. ultimum verò 391.39. conſtituent omnium numerorum Monetariorum Logarithmos.*

Uſus verò talis Tabulæ facilè intelligatur ex comparatione harum præceptionum.

Ego quidem illum hâc vice prætereo, cùm nulla pars Chiliadis à re Monetaria nomen ſortiatur.

Alius uſus indicatus eſt præcepto II.

PRÆCEPTUM VI.

Duos numeros abſolutos in ſe mutuò multiplicare per Logarithmos, & factum invenire.

Multa quidem ſequentium præceptorum, ſeipſis inutilia

videbuntur, cùm facilius & exactius operationes aliquæ peragantur viâ communi: at propter cognationem cum aliis utilioribus, negligenda non fuerunt, lucis causâ.

Quando igitur numeri duo abſoluti, ſunt inter ſe multiplicandi, ut ſciatur factus: tunc hoc eſt perinde, ac ſi in Regula Trium, poneretur primo loco ad ſiniſtram unitas, loco ſecundo & tertio Multiplicans, & Multiplicandus; ut Factus occupet locum quartum, veluti peractâ Regulâ Trium, Quotientem.

Igitur adde Logarithmos duorum numerorum, excerptos ex Chiliade: ſumma quæſita rurſum inter Logarithmos, monſtrat Abſolutum in illorum columnâ numerum, qui ſemper eſt quæſiti pars multiplex, proportionis decuplæ continuæ. Nam ſi uterq; numerorum abſolutorum fuit minor maximo Chiliadis; tunc numero per ſummam Logarithmorum monſtrato ſunt apponendæ ſeptem cyphræ ad dextram, ut ita factus hic rectè comparari poſſit cum facientibus.

EXEMPLUM.

Sint invicem multiplicandi 51200.00. *Log.* 66943.07.
& 76800.00. *Log.* 26396.55.

Summa 93339.62.

Hæc ſumma dat Abſolutum 39330.00. *circiter.*

Igitur factus ex multiplicantibus eſt 393300000000.00. *circiter.*

Sin autem facientes excedunt maximum Chiliadis, tunc per eos excerpi non poteſt, ſed per eorum partes decimas vel centeſimas, &c. & tunc etiam facto, ſic conformato, ut vult præceptum ſuperius, apponendæ ſunt inſuper omnes cyphræ, quæ facientium utriq; junctim fuerunt adimendæ, ut excerptio fieri poſſet.

Vt ſi numerorum ſuperiorum alter fuiſſet uno loco longior, ſcilicet 768000.00. *etiam factus prodiret uno loco longior, ſcilicet*

cet 393300000000.00. *Sin autem etiam alter fuiſſet duobus locis longior, ſcilicet* 5120000.00. *factus prodiret in univerſum tribus locis longior, ſcilicet* 39330000000000.00.

CAUTIO.

Si Logarithmus ex additione excreſceret ſupra maximum Chiliadis Logarithmum, ipſius etiam veſtibuli: aufer ab eo Decuplatorem vel Centuplatorem, &c. ſic ut remaneat minor Maximo Chiliadis: per hoc reſiduum excerptus numerus abſolutus, & per præceptum conformatus, debet jam viciſſim curtari unâ, duabus, &c. figuris.

PRÆCEPTUM VII.

Numerum abſolutum quadrare, ſeu ejus Quadratum præter propter invenire.

Duplica Logarithmum numeri quadrandi, duplum hoc inter Logarithmos quæſitum, exhibet ex columnâ ſuâ numerum abſolutum, cui ſunt apponendæ ad dextram ſeptem cyphræ; ſic habebitur Quadratum numeri propoſiti, ſaltem in primis ejus figuris ad ſiniſtram. Nam loca reliqua ad dextram cyphris impleta, nullius ſunt momenti, etiamſi vel ſcrupuloſiſſimè exprimerentur.

EXEMPLUM.

Quadrandus ſit 3100.00. *Log.* 347376.81.
Ejus duplum 694753.62.
Hoc duplum indicat abſolutum 96.10.
Ergò quadratum quæſitum eſt 9610000.0000.

VEL.

Sit quadrandus 31000.00. *Log.* 117118.30.
Duplum 234236.60.

Hoc

Hoc duplum indicat abſolutum 9610.00.

Ergò quadratum quæſitum eſt 961000000.0000.

PRÆCEPTUM VIII.

Numeri abſoluti Cubum invenire.

Triplica Logarithmum numeri; triplum hoc inter Logarithmos quæſitum, exhibebit primas Cubi quæſiti figuras, quibus apponendæ ſunt aliæ 14.

EXEMPLUM.

Numeri abſoluti 90000.00. *Logarithmus* 10536.05. *Triplicatus facit* 31608, 15. *qui ut Logarithmus dat ex columnâ numerorum abſolutorum* 72900.00.

Ergò Cubus eſt 72900000000000.000000.

PRÆCEPTUM IX.

Si duorum Numerorum abſolutorum Major dividendus eſt per minorem; quotientem eruere per Logarithmos.

Quando dividendus eſt major per minorem: tunc hoc eſt perinde ac ſi in Regulâ Trium, primo loco ad ſiniſtram collocaretur minor, ſecundo major, tertio unitas, quartoq́ loco ad dextram quotiens. Nam ut minor eſt ad majorē, ſic unitas ad quotientem.

Aufer igitur Logarithmum minoris, à Log. unitatis abſolutæ in veſtibulo Chiliadis, ſcilicet ab 1611809. 59. *reſiduo adde Logarithmum majoris, ſumma inter Logarithmos quæſita oſtendit inter Abſolutos quotientem.*

EXEMPLUM.

Sit dividendus 99200. 00. *pro* 3200. 00. *Hujus ergò Logarithmum* 344201. 94. *aufer, & viciſſim illius Logarithmum* 803.22. *adde, ad* 1611809. 59. *conficietur Logarithmus* 1268412. 87. *qui oſtendit obſolutum* 0.31. *Ergò* 0.31. *eſt quotiens.*

VEL.

VEL.

Aufer Logarithmum *minoris à proximè majori* Logarithmo *unitatis cujuſcunq; in Chiliade, reſiduo adde* Logarithmum *majoris, provenit* Logarithmus *Numeri, à quo ſunt abſcindenda totidem loca, quot cyphras habuit unitas illa, quæ* Logarithmum *dedit.*

Vt ſi in exemplo ſuperiori Logarithmum *minoris* 344201. 94. *abſtuliſſes à* 460517. 03. *Logarithmo numeri* 1000. 00. *reſiduus fuiſſet* 116315. 09.

Cui additus majoris Log. 803. 22.
Confeciſſet Logarithmum 117118. 31.
Hic verò indicat 31000. 00. *Quia verò numerus ſeu unitas illa* 1000. 00. *habet* 5. *cyphras, decurta igitur hunc viciſſim* 5. *ultimis locis, manetq;* 31.

OBSERVATIONES.

Si per Diviſoris decuplum diviſeris; prodibit pars decima quotientis quæſiti: & ſic conſequenter.

Si unus vel ambo exceſſerint maximum Chiliadis: decurtatis ambobus æquali numero locorum, ſic ut fiant minores maximo Chiliadis, operatio peragatur, prodibitq; Quotiens juſtus.

EXEMPLA DIMISSIS FIGURIS poſt punctum.

Dividendus ſit 100000. *per* 4362.

Hic poſſum uti diviſoris decuplo 43620. *cujus* Log. *cùm ſit* 82965. *auferam eum à* Logarithmo *proximè majori unitatis alicujus ex Chiliade, ſcil. à numeris* 10000. *Logarithmo* 230259. *reſtat* 147294. *cui jam nihil additur, quia Logarithmus numeri* 100000. *eſt* 0. *Hic ergò Logarithmus oſtendit abſolutum* 22950. *Sed quia unitas uſurpata habet quatuor cyphras, debent ergò vi-*

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ciſſim rejici ab hoc abſoluto, quatuor quidem loca, ut formetur pars decima quotientis, tria verò, ut ipſe Quotiens. Erit igitur ille 23. vel $22\frac{95}{100.}$

Quod ſi dividendus fuiſſet 1000000. diviſor 4362. Tunc pro 1000000. Chiliadis maximum (uſq; ad punctum) ſuperante, ſcripſiſſem 100000. ut qui nō ſuperat, & pro 4362. $436\frac{1}{5}$ utrumque ſcilicet curtaſſem æqualiter.

Tunc uſus priore proceſſu, pro $436\frac{1}{5}$. uſus eſſem ejus centuplo 43620. Et prodiſſet $2\frac{259}{1000.}$ centeſima quotientis, ipſe igitur Quotiens $225\frac{9}{10.}$

ALIUS DIVIDENDI MODUS.

Dividendum majorem decurta, uti curtatus fiat minor diviſore. Tunc à Logarithmo curtati aufer Logarithmum diviſoris, reſiduum erit Logarithmus numeri, qui decurtandus eſt tot locis, ut decurtatio utraq; deleat loca 7. (vel ſi omittimus figuras poſt punctum, loca 5.)

Vt ſi ſit dividendus 99200. per 3200.

Rejectis à dividendo duabus figuris fit 992. jam minor diviſore. Iam igitur per obſervationes ſuperiores ſume utriuſq; decuplum, ut fiant proximi maximo Chiliadis.

Ergò 32000. Logar. 113943.
9920. Logar. 231062.

Reſiduum 117119. Eſt Logarithmus numeri 31000. Quia igitur à dividendo rejectæ ſunt figuræ duæ, rejiciantur jam à Quotiente tres, ut rejectarum ſint 5. formabitur quotiens 31.

PRÆ-

PRÆCEPTUM X.

Ex numero abſoluto, ut Quadrato, Radicem extrahere quadrati.

A numero abſoluto propoſito reſeca loca bina & bina, tantiſper, quoad loca reſidua ad ſiniſtram repreſentent numerum non majorem maximo Chiliadis: Numeri ſic decurtati Logarithmum *adde* Logarithmo *unitatis puræ in veſtibulo Chiliadis: ſummæ ſemiſſis quæſitus inter* Logarithmos, *oſtendet è regione inter abſolutos, primas figuras radicis quæſitæ, cui numero pro binis locis prius reſectis, reſtituendæ ſunt ſingulæ cyphræ. Ita formatur Radix quadrata quæſita.*

EXEMPLUM.

Quadratum eſto 961000000. *quæritur ejus Radix quadrata. Numerus igitur iſte habet loca* 9. *cùm maximus Chiliadis habeat tantùm* 8. *Abſcinde duo ultima (numero pari) ut reſtent ſeptem.*

Ergò 96100.00. *habet* Log. 3978.00.
Sed puræ unitatis in veſtib. Log. 1611809.59.

Summa 1615787.59.
Semiſſis 807893.80.

Hic ſemiſſis indicat abſolutum 31.00. *huic verò pro duobus locis prius rejectis jam reſtitue unam cyphram, fietq́ vera radix* 310.00.

ALIUS MODUS SINE LOGArithmo unitatis.

A numero propoſito rejice loca ad dextram numero impari, ut fiat minor maximo Chiliadis:

Hujus numeri decurtati Logarithmum *ipſum bipartire, cùm*

ſemiſſe inter Logarithmos quæſito, excerpe ex columnâ abſolutorum numerum competentem, qui offert primas ad ſiniſtram figuras radicis quæſitæ: ſed niſi ſeptem omninò loca dempta fuerint initiò, nondum erit hic numerus radix ipſa. Pro binis enim minus quàm ſeptem illic ademptis, ſingulæ cyphræ hîc ſunt adimendæ, pro binis pluſquàm ſeptem ademptis, ſingulæ reſtituendæ.

Et nota, quod etiamſi numerus ipſe ſtatim initio fuerit minor maximo Chiliadis; tamen unus illi locus ſit demendus, ut radici demantur tria loca, vel unus adjiciendus, ut radici demantur quatuor, vel ſi tam eſt parvus, tres adjiciendi, ut radici demantur quinque.

EXEMPLUM.

Vt ſi quadratus proponatur 961000000. *Hic cùm habent loca* 9. *ſi auferres unum, adhuc haberet nimium, octo ſcilicet, & in primo novenarium, cùm maximus Chiliadis habeat octo quidem & ipſe, ſed in eorum primo unitatem. Aufer ergò loca tria (numero ſcilicet impari) reſtant ſex, numerus ſcilicet* 961000. *Hujus Logarithmus eſt* 234236. *uſq; ad punctum, ſemiſſis hujus* 117118. *oſtendit* 31000.00.

Quia igitur quadrato, loca ſunt dempta 4. *minus quàm* 7. *demenda jam ſunt huic numero duo; formaturq́; radix* 310.00.

Si quadratus fuiſſet 9610000000000. *conſtans ſcilicet locis* 13. *ut igitur minor reſtet numerus, quàm maximus Chiliadis: oportet reſcindere loca* 7. *numero ſcilicet impari: & tunc peractâ operatione de invento abſoluto reſcinderetur nihil, quia loca à quadrato reſciſſa, fuerunt numero ſeptenario, quot cyphras habet maximus Chiliadis.*

Si verò quadratus habuiſſet loca 15. *reſcindenda fuiſſent loca* 9. *numero ſcilicet impari, ut ſemper in hoc modo: ut ſcilicet reſtaret numerus minor maximo Chiliadis. Cùm autem* 9. *excedat*

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7. binario, jam igitur ad numerum per operationem inventum, viciſſim fuiſſet apponenda una cyphra.

Deniq; ſi quadratus fuiſſet 9610000. *adhuc rejiciendus fuiſſet ab illo locus unus, ſemper enim in hoc modo aliquid impari numero mutandum eſt. Vnum verò à 7. ablatum relinquit 6. tres igitur cyphræ tunc fuiſſent rejiciendæ, ut radix tunc fiat* 31.00.

Et ſi quadratus fuiſſet 96100. *rejici poterit unus locus, poterit & addi unus, ut prolongatus nihilominus ſit minor maximo Chiliadis. Sed tunc qui apponit unum, is demit uno minus quàm nihil. Differentia verò inter 7. & inter unum minus quàm nihil, eſt 8. quatuor ergo demeret loca de invento* 31000.00. *ut ſic formetur ipſius* 96100. *radix* 310.

Ita ſi quadratus fuiſſet 9610. *potuiſſent addi loca tria, fuiſſetq;* 96100.00. *minor maximo Chiliadis, habens Logarithmum* 3978. *Semiſſis verò* 1989. *oſtendiſſet abſolutum* 98029.00.

Tria verò loca prius appoſita pro 7. delendis, faciunt decem: quinq; igitur hîc dele, ut reſtet Radix 98. *plus, numeri quadratī* 9610. *ferè.*

PRÆCEPTUM XI.

Medium proportionale inter duos Abſolutos datos invenire.

Quia hoc fit in Arithmetica vulgari, multiplicatis in ſe mutuò duobus datis, factiq; radice quæſitâ: fit igitur per Logarithmos ſimiliter, conjunctione in unum, ſexti & decimi præceptorum; in hunc tamen modum commodiſſimè.

Abſolutus uterq; acquirat loca 7. niſi fortè unus eorum fuerit ipſe maximus Chiliadis, huic relinqui poſſunt loca octo. Tunc ſic aptatorum Logarithmi adduntur, cum ſummæ ſemiſſe, ut Logarithmo, excerpitur numerus abſolutus; cui ſunt reſtituenda lo-

da loca prius abſciſſa, vel demenda quæ erant prius adjecta facientibus utriſq;.

EXEMPLUM.

Sint duo numeri 98765 4321. & 59643. *quæritur eorum Medius proportionalis. A primo rejice loca duo ad dextram, ad ſecundum appone duas cyphras:*

Ergò 9876543. *Log.* 1242.25.
5964300. *Log.* 51679.34.

Summa 52921.59.
Semiſſis 26460.80. *Hic dat abſolutum* 76750.65. *Cùm igitur uni datorum dempta ſint loca duo, alteri totidem appoſita: viciſſim huic invento duo ſunt apponenda, duo viciſſim demenda, hoc eſt, compenſatione factâ nihil mutandum. Ita hic ipſe eſt Medium Proportionale quæſitum.*

Hic operæ precium eſt videre, quantus error fuiſſet commiſſus, ſi Logarithmi fuiſſent excerpti per proximè minores vel majores Abſolutos ſine elaboratione ſcrupuloſâ.

Numero 98765.43.
Vicinior Chiliadis & major 98800.00. *dat Log.* 1207.26. *Minorem juſto.*
Et Numero 59643.00.
Vicinior Chiliadis & minor 59600.00. *dat Log.* 51751.46. *Majorem juſto.*

Summa 52958.72. *Propè vera.*
Semiſſis 26479.36.

Iam Logarithmus Chiliadis hoc proximè major, ut qui propior, dat abſolutum 76700.00. *Ergò ſemiſſe ipſi reſpondebit plus aliquid. Itaq; ſi medium eligam inter* 76700. & 76800,

puta

puta 76750.00. *id erit proximum vero. Sanè ſuprà vides inventum* 76750.65.

PRÆCEPTUM XII.

Propoſiti Numeri Radicem invenire Cubicam, ejusq; radicis Quadratum.

Quia unitas eſt ad Radicem Cubicam, ut hæc ad Quadratum ejus, & hoc ad Cubum ejus: ergò à Numero Abſoluto, qui ut Cubus proponitur, rejice ad dextram loca terna & terna tantiſper, quoad uſq; loca reſidua repræſentent non majorem maximo Chiliadis: Numeri ſic decurtati Logarithmum, aufer à Logarithmo unitatis puræ in Chiliadis veſtibulo, reſidui tertiam partem, ſi adjeceris Logarithmo Numeri, conſtitues Logarithmum utilem indagando Cubicæ radicis quadrato, ſi duas tertias adjeceris, fiet Logarithmus pro ipſa radice Cubicâ. Excerpe igitur Abſolutos, cùm utrâq; ſummâ conſtitutâ, inter Logarithmos quæſitâ, & pro ternis locis prius demptis, appone Radicis quidem numero Cyphras ſingulas, ejus verò Quadrati numero binas: ita formabitur, & Radix Cubica & ejus Quadratum.

EXEMPLUM.

Propoſitus eſto Cubicus numerus 729. *cum* 18. *cyphris, loca ſcilicet habens* 21. *Rejice loca* 15. *quinquies ſcilicet terna: quia ſi* 12. *rejiceres, reſtarent* 9. *plura ſcilicet quàm habet maximus Chiliadis.*

Iam igitur 72900.00. *dat Log.* 261866.63.
Sed unitatis primæ in veſtib. Log. eſt 1611809.59.

Differentia 1349942.96.

Seu

Seu quod idem eſt 72900.00.

Dat Log. 31608. 15.
Sed unitatis ſecundæ in veſtibus Log. 1381551.08.

Differentia 1349942.93.
Hujus pars tertia 449980.98.

Summa pro Quadrato 711847.61.

Summa pro Rad. Cub. 1161828.59.

Ergò ſumma prior dat 81.00. *cui appone propter loca* 15. *prius rejecta, cyphras* 10. *fiet* 8100000000000. *Quadratum Radicis Cubicæ.*

Sic poſterior ſumma dat 90. *cui appone pro* 15. *locis prius rejectis jam cyphras* 5. *ita fit Radix Cubica* 90000.00.

PRÆCEPTUM XIII.

Invenire Logarithmum, indicem proportionis, inter duos numeros datos.

Magnum habet uſum hoc præceptum ad Triangula plana ſolvenda, de quibus agemus Capite ſequenti.

Sunt autem Caſus varii. Aut enim uterq; datorum terminorum invenitur expreſſus in Chiliade; aut alter ſolum, aut neuter. Et ſi uterq; in Chiliade; tunc ii aut proximi ſunt invicem, ut 237. 238. *ſeu* 23700. 00. 23800. 00. *& tunc differentia Logarithmorum, Numeris ad latus reſpondentium, eſt quæſitus proportionis Index; ut in hoc Exemplo* 421.05. *indicat proportionem inter* 237. 238. *Aut non ſunt invicem proximi, ſed diſtant interjectis aliis: tunc Logarithmus majoris auferatur à Logarithmo minoris, reſtabit Logarithmus proportionis inter datos terminos.*

Ex-

EXEMPLA.

Sint termini Proportionis 1. *&* 60.

Numeri 1000.00. *Logar.* 460517.03.

Numeri 60000.00. *Logar.* 51082.56. *auf.*

Reſtat Log. proportionis inter datos 409434.47. *qui ideò & ſexagecuplator dici poteſt.*

Sic Numeri 1000.00. *Logar.* 460517.03.

Et Numeri 24000.00. *Logar.* 372970.14.

Reſtat Log. viginti quadruplæ proport. 87546.89.

Sin vel neuter ex terminis, vel alteruter ſolùm invenitur expreſſus in Chiliade: tunc vel cadit talis inter duos Chiliadis, proximos invicē, eſtq́; ſcrupuloſus, vel excedit maximū Chiliadis.

In priori caſu elaboretur prius Logarithmus numeri ſcrupuloſi; & tunc per eum operatio eſt eadem, quæ prius.

In poſteriori caſu ſumantur numeri utriuſq́; æquè multiplices partes, minores maximo Chiliadis, & cum eorum Logarithmis agatur ut ſuprà.

Vt ſi quæratur proportio inter 102400.00.

& 100000.00.

Decurta eos æqualiter, ut ſint eorum partes decimæ ſcilicet

10240.00. *Log.* 227886.86.

10000.00. *Log.* 230258.51.

Erit proportionis Log. 2371.65.

NOTA.

Si numerorum alter fuerit ipſe Maximus Chiliadis, tunc ipſe Logarithmus alterius numeri, eſt Index proportionis inter utrumq́;, ſeu Poſitivus fuerit Logarithmus, ſeu Privativus. Logarithmus enim definitus eſt poſt Prop. XX. nihil aliud quàm hæc ipſa Proportio.

PRÆCEPTUM XIV.

Proportionem cum terminis ſuis datam ſecare in partes, quæ ſint ad invicem in alia proportione propoſitâ.

Data ſit Proportio inter terminos 37. *&* 53.

Hæc proportio ſit ſecanda in partes duas, quarum una ſit ad alteram, ut 5. *ad* 2.

Igitur conſtituatur quantitas proportionis ſecandæ per præcedens præceptum.

		Logarithmi		Logar.
Termini	5300.	—293746.	*vel* 53000.	—63488.
	3700.	—329684.	37000.	—99425.
Proportio		35938.		35937.

Iam ſecundæ Proportionis, ſecundum quam ſecanda eſt prima, Termini ſunt 5. *&* 2. *Summa* 7. *Divide igitur proportionis primæ quantitatem in* 7. *erit pars ſeptima* 5134. *&* *duæ ſeptimæ* 10268. *Ergò quinq; ſeptimæ* 25670.

Quantitate partium inventâ, jam duplici viâ poteſt ſecari in has partes prima proportio: Aut enim ut pars major ſtet à plagâ termini majoris.

Igitur termini majoris Logarithmo	63488.
Adde partem majorem	25670.
Summa	89158.

Hæc ut Logarithmus oſtendit abſolutum 41000. *ferè. Ergò ut ſe habet* 5. *ad* 2. *ſic ſe habere fecimus proportionem inter* 53. 41. *ad proportionem inter* 41. 37.

Aut ut pars minor ſectæ, ſtet à plaga termini Majoris.

Eidem

Eidem ergò termini majoris Logarithmo	63488.
Adde partem minorem	10268.
Summa	73756.

Hæc ut Logarithmus oſtendit 47830.*circiter.*

Ergò ut ſe habet 2. *ad* 5. *ſic fecimus ſe habere proportionem inter* 53. $47\frac{83}{100.}$ *ad proportionem inter* $47\frac{83}{100.}$ 37.

Idem efficiemus etiam per Logarithmum Termini Minoris, ſubtrahentes ab eo.

ALIUD EXEMPLUM ET NOBILE quidem.

Datur proportio inter dies 687. *periodi Martis &* $365\frac{1}{4.}$ *periodi Solis (Terræ Copernico) ſit hæc proportio ſecanda in partes duas, ſic ut major ad minorem ſe habeat, ut* 2. *ad* 1. *& ut major pars proportionis diviſæ ſtet à plaga termini Minoris, ut ita Proportio tota ſit ejus partis majoris ſeſquialtera.*

Ergò Termini Majoris	68700. *Log.*	37542.
Termini Minoris	36525. *Log.*	100740.
Quantitas ergò proportionis		63198.

Proportionis verò diviſoriæ termini 2. 1. *faciunt* 3. *quâ ſummâ, diviſa quantitas Proportionis, facit ejus trientem* 21066. *& duos Trientes* 42132. *Hos aufer à Logarithmo partis minoris* 100740.

Reſtat 58608.

Hoc ut Logarithmus oſtendit Numerum abſolutum 55650. *Ergò ut* 1. *ad* 2. *Sic fecimus proportionem inter* 68700.58608. *ad proportionem inter* 58608.36525.

Quodſi ex termino minori 36525. fiat 100000. diſtantia mediocris Solis & Lunæ, tunc ex hoc invento termino Majori 58608. fiat 1524.00. ferè: diſtantia Solis & Martis mediocris.

Et fit manifeſtum, quod proportio Periodicorum temporum ſit ſeſquialtera proportionis Intervallorum mediocrium: ut indicavi in Epitomen Aſtronomiæ Cop. libro IV.

PRÆCEPTUM XV.

Regulam Proportionum ſeu Detri abſolvere per Logarithmos, ſeu ſine Multiplicatione & Diviſione.

Poſitis in Regula tribus datis Numeris, in Chiliade comprehenſis, ut docet vulgaris Arithmetica, aufer Logarithmum ſiniſtimi à Logarithmo medii, vel hunc ab illo: differentiam Logarithmo dextimi adde in primo caſu, ſubtrahe in ſecundo, ſi poteſt: ſumma illic, vel hic Reſiduum, eſt Logarithmus Quarti quæſiti ſeu Quotientis poſitivus.

Rurſum autem ſi Logarithmus Tertii fuerit minor reſiduo, ſubtrahe viciſſim illum ab hoc, remanebitq́ privativus Logarithmus, numeri ſcilicet abſoluti, ſeu Quotientis, ſuperantis maximum Chiliadis.

EXEMPLUM PRIMI CASUS.

77100. *dat* 53200. *quid* 92500.

Log. 63111.

Log. 26007. *Subt.*

Reſiduum 37105.

Logar. 7796. *adde*

Logarithmus 44901. *Quotientis* 63800. *plus.*

EXEM-

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EXEMPLUM SECUNDI CASUS.

876. dat 941. quid 765.

Log. 6081. Subtrahatur ut minor.
Log. 13239.

Reſiduum 7158. Subtrahe quia ſecundus ſubtractus
Logarithmus 26788.

Logarithmus 19630. Quotientis 822. minus.

EXEMPLUM CASUS TERTII.

889. dat 996. quid 960.

Log. 401. Subtrahatur ut minor.
Log. 11766.

Reſiduum 13365. Subtrahendum erat, quia ſecundus ſubtractus fuit.
Logarith. 4082. Subtrahe hunc quia minor eſt reſiduo.

Logarith. 7283. Privativus, quia tertius ſubtractus fuit. Hic igitur privativus per IV. præceptum, dat Quotientem 1075. majorem maximo Chiliadis 1000. ut hîc quidem operamur per curtatos.

NOTA.

Licet autem commoditatis cauſa, omnes tres in Regulâ poſitos, vel prolongare, vel curtare, ut fiant proximè minores maximo Chiliadis: & tunc quotiens, qui pro ſic accommodatos elicitur, idem debet pati, quod paſſus eſt ſiniſtimus: eos verò locos, qui ſecundo & tertio fuerunt adempti vel appoſiti ſolus, quotiens omnes contrariâ ratione vel recipere debet, vel amittere.

CAPUT

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CAPUT IX.

De copulatione columnæ Logarithmorum cum duabus aliis junctis.

PRÆCEPTUM GENERALE.

QVotieſcunq; in Regulam Proportionum offeruntur diverſarum Columnarum Numeri, ſicut duo quidem ex iis ſint ex unius Columnæ genere, unus verò reſiduus cum quotiente quæſito competat in columnam alteram: tunc operatio per Logarithmos perfici poteſt; tam in vulgaribus ſeu Abſolutis Numeris, quàm in Logiſticis.

Hujus mixturæ dabo aliquot Exempla, tanquam Præcepta particularia.

I. PRÆCEPTUM.

Dividere Horas vel Gradus per ſexagenaria ſcrupula.

Quia enim eſt, ut diviſor Sexagenarius, ad Dividendum, ſic Integrum ſeu 60′. ad Quotientem: Diviſor igitur & Integrum, ſunt ex genere eodem ſexagenario, Dividendus verò & Quotiens poſſunt eſſe ex Quadrivicenariâ. Poſſunt igitur illa Exempla Capitis VI. Præcepti III. ubi dividendus aliquot integra continet, poſſunt, inquam, plerunq; per Quadrivicenariam perfici.

Vt ſi dividendi, ut ſuprà, 3. G. 45′. 13″. in 57′. 8″. Sic age:
Gr. 3. 45′. 13″. Log. 185470. circ. ex Quadrivic.
Scr. 57. 8. Log. 4900. ex Sexagenar.

Reſiduum 180570. dat ex Quadrivicenaria quotientem 3. G. 56′. 30″. ut & Cap. VI.

II. PRÆ-

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II. PRÆCEPTUM.

Partem, proportionalem ſcrupulis ſexagenariis, capere de differentiâ, excedente integrum.

Addantur Logarithmi Scrupulorum, in ſexagenaria, & differentiæ excedentis in Quadrivicenaria, quæſitorum ſumma ex Quadrivicenaria oſtendit partem proportionalem.

Vt ſi uni Gradui Anomaliæ mediæ reſpondeant 1. G. 24'. 17". *coæquatæ, quid competit Minutis* 49. 23.

Gr. 1. 24'. 17". *Log.* 284000. *circiter.*
Sc. 49. 23. *Log.* 19480.

Summa 303480. *dat* 1. G. 9'. 15". *tantùm competit ſcrupulis* 49. 23.

III. PRÆCEPTUM.

Dato diurno, Solis, vel Planetarum 5. unius, colligere aliquot horarum motum.

Si diurnus minor eſt quàm 60'. *ut in Saturno, Iove, Marte, & in Sole; quære eum in Sexagenaria, numerum Horarum in Quadrivicenaria, & adde eorum Logarithmos; Summa in* Logarithmis *quæſita, eruet ex Sexagenaria partem Horis competentem.*

In Sole, Venere, Mercurio, ſi diurnus eſt inter 1. *&* 2. G. *quære proportionalem partem de exceſſu ſupra* 1. G. *eamq; adde ad id, quod horis datis in ſexagenaria reſpondet per Caput IV. In Mercurio verò, ſi ejus diurnus ſuperat* 2. G. *partem proportionalem de Exceſſu, adde duplo illius, quod horis datis reſpondet in ſexagenaria.*

Aliter, quia diurnus plerunq; conſtat integris ſcrupulis, ſine appendice ſecundorum: quærere illa poteris non in ſexagenariâ,

ſed

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ſed inter abſolutos, prolongata priùs, ut Cap. VIII. docui: & tunc quæ ex Logarithmis colligitur ſumma, quæſita in Logarithmis, *rurſum inter abſolutos oſtendet partem proportionalem decurtandam iterum totidem locis.*

EXEMPLA.

Sit diurnus 17′. *horæ*, 19. 48′. 0″.		VEL.	
Horar. 19. 48′. Log.	19237.		19237.
Ser. 17′. *ex ſexag.* Log.	126200.	*Ex abſolutis* 17000. Log.	177200.
Summa	145437.	*Summa*	196437.
Pars proportionalis ex ſexagenariâ	14′. 1″.	*Ex abſol. colum.*	14020.

Iam ſi Veneris diurnus fuiſſet 1. G. 17′. *tunc è regione* H. 19. 48′. *invenio ſcrupula* 49′. 30″. *quæ addenda ſunt ad* 14′. 1″. *partem proportionalem de exceſſu, eſſetq́; arcus quæſitus* 1. G. 3′. 1″. *Et ſi Mercurii diurnus fuiſſet* 2. G. 17′. *duplicanda fuiſſent illa* 49′. 30″. *addendaq́;* 14′. 1″. *ita collegiſſemus* 1. G. 53′. 1″.

IV. PRÆCEPTUM.

Horarium elicere ex motu aliquot Horarum datarum, minore quàm 60′.

Aufertur Logarithmus *Horarum datarum, in quadrivicenariâ quæſitarum, à* Logarithmo *ex ſexagenariâ ſcrupulorum, Horis competentium; Reſiduum, ut* Logarithmus, *ex ſexagenaria exhibebit Horarium. Exempla ſunt facilia & obvia.*

V. PRÆCEPTUM.

Datâ ſeparatione diurnâ minore quàm 60′. & diſtantiâ Planetæ, ab alterius aſpectu, minore ea quàm eſt diurnus, prodere Horarum intervallum reſpondens.

In ſexagenariâ, vel etiam inter Abſolutos, quæſitis diurna ſepa-

ſeparatione & diſtantiâ, Logarithmus illius aufertur à Logarithmo hujus, reſiduum, ut Logarithmus exhibet Horas ex Quadrivicenariâ, reſpondentes diſtantiæ ſeu intervallo.

VI. PRÆCEPTUM

Hoc modo etiam ingreſſus Solis in ſigna computatur: Per diurnum ſcilicet Solis, & per diſtantiam ejus à principio ſigni, in meridie vicino, in ſexagenariâ quæſitis, & Logarithmo illius ablato à Logarithmo hujus. Reſiduum enim, ut Logarithmus, oſtendit in Quadrivicenariâ, Horas ante vel poſt meridiem.

Plurima alia per hanc combinationem columnarum perfici poſſunt: ſed ſex iſta exemplorum loco ſufficiant. Iam enim ad rariora & ſcrupuloſiora nonnulla tranſeundum, ſuprà dilata, & in hunc locum rejecta.

VII. PRÆCEPTUM.

Cuilibet arcui Sinum ſuum ſcrupuloſum aſſignare per Logarithmos.

Subſidium, ut vides, paratur hîc Capiti II. ut in ejus tractatione promiſeram. Quanta igitur ſit operationis certitudo, vide ibi: nunc modum doceo.

Ab arcu dato aufer proximè minorem Chiliadis, & exſcribe ejus Sinum Rotundum, ut jam corrigatur, ſuamq; acquirat ſcrupuloſitatem. Tunc in ſexagenariâ, quæſitis & exceſſu arcus dati, & differentiâ binorum arcuum Chiliadis, inter quos arcus propoſitus intercidit, auferatur Logarithmus huius à Logar. illius: Reſiduum immiſſum in Logarithmos, *oſtendit inter Abſolutos Numerum, qui præciſis tribus ultimis locis ad dextram, fit augmentum ſcrupuloſum exſcripti Sinus rotundi.*

EXEMPLUM.

Propoſitus eſto arcus 37.G.49′.53″.
*Proximè minor Chil.*37. 48. 26.*dat Rotund.*61300.00.

Reſidui 0. 1′.27″.*Log.*372900.*circ.*
Differentiæ inter duos Chil. 4.21.*Log.*262400.*circ.aufer.*

Reſiduum 110500.

Hoc quæſitum, ut Logarithmus, dat inter Abſolutos Numerum 33190.00.*circiter. Ergò præciſis* 3.*locis, acquirimus* 33.19. *& fit Sinus ſcrupuloſus arcui propoſito conveniens* 61333.19.

CAUTIO.

In fine Quadrantis, ubi differentia in Chiliade ſuperat 60′. *uti liceret Columnâ Quadrivicenariâ, niſi tum ſimul etiam proportionalitas, quam hoc præceptum præſupponit, inſigniter turbaretur.*

VIII. PRÆCEPTUM.

Viciſſim cuilibet Sinui Scrupuloſo, ſuum aſſignare arcum.

Primùm cum Sinu rotundo, proximè minori, exſcribe arcum & differentiam ſubjectam. Tunc ad 4. *ultimas figuras Sinus ſcrupuloſi (ad exceſſum ſcilicet Sinus dati ſuprà rotundum Chiliadis proximè minorem) appone tres Cyphras, & quæſito Numero ſic formato inter Abſolutos, differentiâ verò in ſexagenariâ, adde eorum Logarithmos; Summa ut Logarithmus, oſtendet in ſexagenaria, ſcrupula prima & ſecunda, addenda arcui exſcripto.*

EXEMPLUM.

Ut ſi detur Sinus ſcrupuloſus 61333.10. *Proximè minor rotundus* 61300.00. *dat arcum* 37.G.48′.26″. *Et differentiam* 4′.21″.

4'.21". cujus Logarithmus 262400. circiter. Quatuor autem ultimæ Sinus ſcrupuloſi figuræ hic ſunt 3310. prolongatus hic numerus, ut ſit 33100.00. dat Logarith. 110500. qui additus ad priorem, facit ſummam 372900. circ.

Hæc oſtendit partem proportionalem 1'. 27". Ergò Arcus erit 37. G. 49'. 53".

IX. PRÆCEPTUM.

Cuilibet arcui ſuum aſſignare Logarithmum ſine magno labore.

Rurſum hic ſubſidium paratur doctrinæ Triangulorum Sphæricorum, Cap. VII. traditæ, pro curioſis, qui dedignantur operari cum Logarithmis rudibus. Præceptio erit verboſa quidem; at non valdè neceſſaria, ne metuas calculator.

Cùm enim in hâc Chiliade, tam arcus, quàm Logarithmi exhibeantur ſcrupuloſi; & differentiæ, inter arcus quidem interjectæ, creſcant continuò inter Logarithmos verò, decreſcant; ut ita neutrobiq; maneat unus & idem numerus conſtans: laborem equidem haud levem ſumpſerit, qui, quotieſcunque opus fuerit Logarithmo exacto, toties multiplicatione Scrupulorum & ſecundorum Exceſſus arcus, in differentiam Logarithmorum, ut in numerum apicibus carentem (diverſi ſcilicet generis) & rurſum, facti diviſione in differentiam, ex Scrupulis & ſecundis conſtantem, venari velit partem proportionalem.

Hic igitur juvent Logarithmi *ſeipſos, ut contribules. Cùm arcu Chiliadis, qui proximè minor propoſito arcu vel angulo fuerit, exſcribe* Logarithmum *exactum; eumq; arcum ſubtrahe à propoſito: & quæſitis in ſexagenariâ, tam exceſſu propoſiti, quàm differentia inter duos arcus Chiliadis, inter quos cadit propoſitus,* Logarithmum *hujus ruditer ſaltem excerptum, aufer à* Loga-

rithmorudi illius: reſiduum junge Logarithmo rudi differentiæ, vicinorum duorum Logarithmorum prolongatæ ſecundum præcepta præcedentis Capitis, & quæſitæ inter abſolutos: Summa ut Logarithmus oſtendit, rurſum inter abſolutos, numerum, qui decurtatus, prodit partem proportionalem, auferendam à Logarithmo exacto arcus proximè minoris, primum exſcripto, ut juſtus conſtituatur Logarithmus arcus propoſiti.

EXEMPLUM.

Cupio Logarithmum Arcus 71.G.40'.10". *In Chiliade invenio proximè minorem* 71. 37.21.*Log.*5234.65.

Exceſſus dati	2'.49".*Log.*305800.
Differentia duorum in Chiliade	10.57. *Log.* 170000.*rudes.*
Reſiduum	135800.

Differentia duorum Logarithmorum 105.32. *prolongata ut fiat* 10532.00. *inter abſolutos quæſita dat Logarithmum* 225000.*rudem.*

Adde reſid. 135800.

Summa 360800. *Hæc ut Logarithmus oſtendit inter abſolutos* 2725.00. *Deletis verò iterum duobus ultimis, fit pars proportionalis* 27.25. *quibus ablatis ab exſcripto* 5234.65. *reſtat* 5207.40. *Logarithmus, quantum proportionalitas locum habet, exactus. Nam Capite VIII. veriores, & plerunque exactiſſimos docuimus aſſignare Sinubus, qui per eos ſuis arcubus tranſcribi poſſunt.*

X. PRÆCEPTUM.

Viciſſim Logarithmo ſcrupuloſo arcum ſuum aſſignare.

Primùm cum Logarithmo Chiliadis, qui proximè major fuerit

fuerit propoſito, exſcribe arcum ſcrupuloſum, cum differentia ſubjecta. Tunc ſubtrahe Logarithmum propoſitum ab exſcripto proximè majore: Exceſſum illius, & ſimul differentiam duorum in Chiliade, prolonga æquali locorum numero, ut ſint tamen minores maximo Chiliadis. Sic igitur formatis iis, & inter abſolutos quæſitis, Logarithmum huius ab illius Logarithmo aufer, reſiduo adde Logarithmum differentiæ arcuum in ſexagenariâ quæſitæ; ſic accumulatur Logarithmus partis proportionalis ex ſexagenariâ itidem excerpendæ, & addendæ arcui exſcripto.

EXEMPLUM.

Sit Logarithmus	5207.40.	
Prox. major	5234.65.	*dat* 71.G.37'.21''. *& diff.* 10'.57''.
Exceſſus	27.15.	
Diff. Logarithmor.	105.32.	
Hi Num. prolongati	2715.00.	*dant rudes* 360800.
	10532.00.	225000.
	Differentia	135800.
	Differentiæ arcuum Log.	170000.
	Summa	305800. *oſtendit*
	partem proportionalem	2'. 49''.
	Ergò Arcus	71.G.40'.10''.

Habent igitur curioſi quod agant, ſi rudibus Logarithmis, minimo cum decimo, uti dedignantur. Veruntamen qui tales futuri ſunt, iis conſultum eſt, ut privatâ quilibet operâ, & in veſtibulo Chiliadis columnam arcuum hîc vacantem impleat, & in fine Quadrantis, decem ultimas arcuum differentias, in denas ſubdividat, Sinuum quidem differentias ſtatuens æquales, eis verò Sinubus ex Canone Sinuum exacto ſuos adſcribens arcus, & Logarith-

garithmos Sinubus ſuos ex doctrina Capitis prioris accommodans.

Nam pars proportionalis, uſitato modo quæſita, locum non habet in fine Quadrantis: ut Capite ſecundo monui.

XI. PRÆCEPTUM.

Per ſolos Logarithmos, Abſolutorum, & Arcuum ſeu Angulorum, omnia Triangula plana ſolvere: omnia ſcilicet quæſita ex tribus datis eruere.

Ad hoc caput propriè pertinet hæc doctrina, quia jungi debet Columna Abſolutorum (non ut ii ſunt Sinus arcuum) & columna ipſorum arcuum. Sunt autem Caſus ſex.

I. Si datis angulis & uno latere, quæritur latus.

Tunc prolongato vel decurtato latere, ut Capite VIII. doctus es, adde Logarithmos, lateris dati & anguli quæſito lateri oppoſiti; à ſummâ aufer Logarithmum anguli, dato lateri oppoſiti, reſtat Logarithmus lateris quæſiti, ſimiliter prolongati.

Si ſubtractio fieri non poteſt, viciſſim ſummam ſubtrahe, reſtabitq́ privativus Logarithmus, lateris excedentis maximum Chiliadis.

EXEMPLUM.

Dentur Anguli 50. G. 0′. *&* 60. G. 0′. *datur igitur etiam reſiduus, ut complementum illorum duorum ad Semicirculum ſcilicet* 70. G. 0′. *detur & latus oppoſitum medio angulo* 573. *quæritur latus oppoſitum maximo.*

Lateris

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Lateris 57300.00.*(prolongati) Log*. 55687.
Anguli 70.G.0′. *Log*. 6220.*circ.*

Summa 61907.
Anguli 60.G.0′. *Log*. 14380.*circ.*

Reſiduum 47527.
dat 62175.00.
Latus ergò eſt 622.*ferè.*

Quodſi Rectus fuerit angulorum unus, & detur ei ſubtenſum latus, ſufficiet ſola Additio.

Sin autem quæratur latus recto ſubtenſum, ſufficiet ſola ſubtractio Log. anguli à Log. lateris oppoſiti. Reſtabit enim Log. *lateris recto ſubtenſi.*

II. Si datis duobus lateribus, & angulo uni eorum oppoſito, quæruntur anguli reliqui.

Tunc lateribus æqualiter prolongatis vel decurtatis, ut ſint proximè minora maximo Chiliadis, adde Logarithmos, Anguli & lateris unius adjacentis; à ſummâ aufer Logarithmum lateris dato angulo oppoſiti, reſtat Logaritmus anguli, lateri alteri oppoſiti, qui angulus interdum tàm poteſt eſſe minor quadrante, quàm major: & ſic Complementum ad Semicirculum ejus, quem Logarithmus excerpit: quantiſper non plura dantur. Tertius verò angulus, eſt duorum junctorum complementum ad Semicirculum.

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EXEMPLUM.

Vt ſi dentur Latera 622. 507. Et huic oppoſitus 50. G. 0'. quærantur Anguli reliqui.

Anguli 50. G. 0'. *Log.* 26650.
Adjac. lateris 62200.00. *Log.* 47527.

Summa 74177.
Oppoſiti lateris 50700.00. *Log.* 67957.

Reſiduum 6220. *dat Ang.* 70. G. 0'. *alteri lateri oppoſitum.*

Si ergò duo ſunt 50. G. 0'. *&* 70. G. 0'. *Tertius erit eorum ſummæ complementum ad duos rectos ſcilicet* 60. G. 0'.

Si verò angulus prodiens ſumeretur non 70. 0. *Sed complementum ad ſemicirculum* 110. 0. *Tertius fiet* 20. 0.

Si datus angulus fuerit Rectus; ſufficiet ſola ſubtractio Logarithmi lateris recto oppoſiti, à Log. lateris reliqui dati: reſtabit enim Logarithmus anguli ei oppoſiti.

Si latus dato angulo oppoſitum Logarithmum habuerit æqualem ſummæ priorum: rectangulum erit Triangulum.

III. Si datis duobus lateribus, & angulo uni eorum oppoſito quæratur latus tertium.

Tunc primùm, ut in ſecundo caſu, quæratur angulus reliquo lateri dato oppoſitus; additis Logarithmis, Anguli dati, & lateris ei adjacentis; à ſummâ verò dempto Logarithmo lateris dato angulo ſubtenſi: cum reſiduo, ut Logarithmo, exſcribatur angulus, & jam ſumma duorum angulorum à duobus rectis ablatâ, conſtituitur angulus tertius, cujus Logarithmus, ut in primo caſu addendus eſt Logarithmo unius ex lateribus, à ſummâ auferendus

Loga-

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Logarithmus Anguli oppoſiti; reſtabitq́ Logarithmus lateris tertii.

Vt in Exemplo priori, ſumpto Angulo ſecundo 70. G. 0′. *&* *invento angulo tertio* 60. G. 0′. *Ejus Logarithmo*

	14380.		14380.
Addatur lat. 622. Log.	47527.	*vel lateris* 507. Log.	67957.
A ſummâ	61907.	*vel*	82337.
Aufer anguli 70. G. *Log.*	6220.	*vel ang.* 50. G. *Log.*	26650.
Reſtat	55687.		55687.

Logarithmus lateris tertii quæſiti 57300.00. *ſed decurtati, ut priora*, 573.

At ſi angulus in priori præcepto prodiens ſumatur non 70. G. 0′. *ſed* 110. G. 0′. *& tertius ideò ſit* 20. G. 0′. *hujus igitur Logarithmus* 107290. *additus Logarithmis datorum laterum, & ablatis Logarithmis angulorum oppoſitorum, dat Logarithmum* 148600. *lateris tertii, angulo ſcilicet* 20. G. 0′. *oppoſiti, ſcilicet* 22630.00. *decurtati igitur* $226\frac{3}{10}$.

Si angulus datus fuerit Rectus, aufertur Logarithmus lateris recto oppoſiti, à Logarithmo lateris reliqui, reſtat Logarithmus anguli: hujus complementi Logarithmus, viciſſim additus Logarithmo primo, lateris recto oppoſiti, dat Logarithmum lateris reliqui.

IV. Si datis duobus lateribus, & angulo comprehenſo, quærantur anguli reliqui.

Hic via directa ſolvendi hunc caſum utitur Meſologarithmis, qui non aliter elici poſſunt ex Chiliade, quàm ſi Logarithmos arcus ejusq́ complementi ab invicem ſubtrahamus: ut ſic datâ eorum differentiâ, ipſi Logarithmi partium quadrantis non directà poſſint accipi, ſed poſitione ſit utendum.

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Dimiſſo igitur hoc modo; ne tamen manca hîc ſit Chilias noſtra: utamur poſitionibus, potius in aliâ viâ facili & indirectá: etſi & hæc aptior ſit Logarithmus Canonicis Quadrantis.

Eſt autem talis:

Datis lateribus quæratur eorum proportio: fit enim faciliмè, per Capitis VIII. Præceptum XIII.

Hæc verò proportio, cùm ſit differentia inter Logarithmos angulorum reſiduorum, quorum angulorum ſumma eſt in anguli dati Complemento ad Semicirculum: Ponatur igitur angulus minor eſſe notus, auferaturq́; à dati complemento ad Semicirculum, reſidui Logarithmo adde proportionem laterum inventam; Summa ut Logarithmus, *ſi dat arcum eundem, quem poſueras, felix fuit poſitio; Sin diſcrepat, muta poſitionem primam, ſumens vel aliquid intermedium, ſi reſiduum ex complemento ad Semicirculum fuerit Quadrante minus: vel aliquid longius à primâ poſitione recedens, quàm quod prodierat; ſi reſiduum ex complemento ad Semicirculum fuerit majus Quadrante; præſertim ſi valdè magnum.*

A tali nova poſitione incipiat nova operatio: Id fiat tantiſper, donec prodeat id, quod ultimò fuit poſitum. Ita habebis utrumq́; angulum ex quæſitis.

Conducit autem primas poſitiones ſic moderari, ut remaneat de complemento ad Semicirculum aliquid quod exactè reperiatur in Chiliade.

EXEMPLA.

Dentur latera 507. *&* $226\frac{3}{10}$. *comprehenſus eſto* 110. G. *ut ſit ejus complementum ad Semicirculum* 70. G. *Quæruntur duo anguli reſidui; quos junctos ſcio facere* 70. G.

Primùm

Primùm quæro proportionem laterum.

50700. - - - - - - - - - - - - - -	67957.
22630. - - - - - - - - - - - - - -	148600.
Proportio	80643.

Compl. ang. ad Semic. 70. G. 0′.

Poſitio arbitraria	10. G. 0′. 10″.	
Reſiduum	59. 59. 50. *Log.*	14387.
Prodit	22. 45. *circ.*	95030.
Poſitio ſecunda	17. G. 3′. 37″.	
Reſiduum	52. 56. 23.	22565.
Prodit	30. 52. *circ.*	103208.
Poſitio tertia	19. G. 0′. 47″.	
Reſiduum	50. 59. 13.	25231.
Prodit	20. 17. *circ.*	105874.

Hoc modo cum medio Arithmetico interpoſitum & prodeuntem ſemper poſſemus propius ad conſenſum venire. At quia ſtatim in ſecunda poſitione apparuit, veritatem eſſe ultra medium Arithmeticum: Sumemus etiam in quarta poſitione aliquid, quod propius ſit prodeunti 20. G. 17′. *quam poſito* 19. G. 1′. *tentabimus ſcilicet* 20. G. 0′.

Poſitio quarta	20. G. 0′. *Proportio*	80643.
Reſiduum	50. 0. Logarith.	26650.
Prodit	20. 0.	107293.

Hæc ergò tandem felix fuit poſitio, & Anguli quæſiti ſunt 20.G.0'.& 50.G.0'.

EXEMPLUM ALIUD.

Dentur latera 507.573.*& comprehenſus* 70.G.*ut reſiduum ad Semicirculum ſit* 110.G.0'.

Quæro proportionem laterum.

50700.			67957.
57300.			55687.
Compl.ang.ad Semic. 110.G.		*Proportio*	12270.
Poſitio arbitraria	29.G.56'.14".		
Reſiduum	80.	3.46.*Log.*	1511.
Prodit	60.	36.*circiter*	13781.
Poſitio ſecunda	45.G.58'.22".		
Reſiduum	64.	1.38.	10647.
Prodit	52.	40. *circ.*	22917.
Poſitio tertia	49.G. 4'.13".		
Reſiduum	60.	55.34.	13467.
Prodit	50.	38.	25737.
Apparet ponendum	50.G. 0'.		
Reſiduum	60.	0.	14380.
Prodit	50.	0.	26650.

Ergò anguli quæſiti ſunt 50.G.0'.& 60.G.0'.

EXEM-

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EXEMPLUM TERTIUM.

Dentur latera, ut prius 507. 573. *ſed comprehenſus ſit* 20. G. *Complementum ad Semicirculum* 160. G. *Manente igitur laterum proportione.*

Compl. ad Semic.	160. G. 0'.		12270.
Sit poſitio arbitrar.	70. G.	*Logarith.*	
Reſiduum	90.	*Logarith.*	0.
Prodit	62. G. 8'. *circiter.*		12270.
Poſitio ſecunda	54. G. 47'. 45''.		
Reſiduum	105. 12. 15.		
	74. 47. 45.	*Log.*	3563.
Prodit	58. 35.		15833.
Poſitio tertia	60. G. 0'.		
Reſiduum	100. G. 0'.		
	80. 0.	*Logarith.*	1530. *circ.*
Prodit	60. G. 35.' *circ.*		13800.
Poſitio quarta	61. 0.		
Reſiduum	99. 0.		
	81. 0.		1240.
Prodit	60. 52.		13510.

Ergò poſitio felix erit 60. G. 47'. *circiter.*

Hic cum in primâ poſitione 70. G. *Reſiduum fieret* 90. G. *prodiit aliquid minus, ipsâ poſitione ſcilicet* 62. G. 8'. *Reſiduum igitur apparuit futurum majus quadrante. In hoc ergò caſu poſi-*

tionem ſecundam longius à primâ diſtare feci, quàm id quod per primam prodiit.

Sic in poſitione ſecundâ 54. G. 47′. *prodiit* 58. G. 35′.

Ergò poſitio tertia 60. G. 0′. *longius diſtare juſſa eſt, à poſitione præcedenti* 54. G. 47′. *quàm id quod prodierat* 58. G. 35′. *minus tamen quàm quod primò prodiit, ſcilicet* 62. G. 8′. *Et in poſitione tertia* 60. G. 0′. *prodiit major* 60. 35. *feci ergò quartam adhuc majorem, ſcilicet* 61. G. 0′. *Per hanc autem quartam* 61. G. 0′. *prodiit jam minus* 60. G. 52′.

Ergò quinta poſitio adhuc minor eſt facta, major tamen quàm 60. G. 35′. *quod prius prodierat, ſcilicet* 60. G. 47′. *Eſt igitur angulus minor* 60. G. 47′. *major* 99. G. 13′. *ferè.*

Si datus fuerit Rectus: reliqui duo ex Canone Neperiano facilè habentur, quæſitâ proportione laterum inter Meſologarithmos, inventa enim ea oſtendit utrumq; angulum.

V. Si datis duobus lateribus & angulo comprehenſo quæratur latus tertium.

Nulla eſt alia machina, quàm ut prius quærantur anguli, per præcedens. Tunc iis inventis, cadit quæſtio in caſum primum.

Si tamen angulus datus ſit Rectus, Logarithmos laterum duplica, duplicatorum Logarithmorum numeros abſolutos adde, ſummæ Logarithmum dimidia; Semiſſis iſte, ut Logarithmus, dabit inter abſolutos quæſitum latus.

VI. Si datis tribus lateribus quæratur Angulus.

Tunc ante omnia ex majori angulo reſecandum eſt Triangulum æquicrurum, cujus crura ſint linea ſectionis & latus minus; Baſis verò ſegmentum lateris majoris. Id verò obtinetur in hunc modum.

Adde

Adde Logarithmos & differentiæ, & ſummæ laterum minorum, à Logarithmorum ſummâ aufer Logarithmum majoris lateris, reſiduum ut Logarithmus oſtendet inter abſolutos, partem de latere majori ſubtrahendam, ut reſtet baſis æquicruri ſupradicti.

Conſtitutâ hac Baſi, Maximus angulorum habetur per ſua Elementa, ſi exſcripſeris Logarithmos tam ſemiſſis de baſi, quàm reſidui de latere majori, poſt ablatum baſis ſemiſſem; & ab illo quidem minoris, ab iſto verò medii lateris Logarithmos abſtuleris, relinquuntur enim Logarithmi duarum partium anguli maximi. Duo verò minores anguli ſunt horum majoris Elementorum Complementa.

EXEMPLUM.

Sint latera	507. 573. 622. *quæruntur anguli.*		
Latus minus	507.		
Medium	573.		
Differentiæ	66.	*Scribo* 66000. *Log.*	41552.
Summa	1080.	*Scribo* 10800. *Log.*	222562.
			264114.
Lat. maxim.	662.	*Scribo* 62200. *Log.*	47482.
Prodit	11460.	*Reſiduum*	216632.

Ad primum tres cyphræ acceſſerunt, ad ſecundum una, quæ ſunt à prodeunte removendæ: viciſſim ad tertium duæ appoſitæ, ſunt etiam ad Quotientem apponendæ: duabus igitur appoſitis, & quatuor remotis formatur pars lateris majoris $114\frac{6}{10}$.

Pars

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Pars lateris majoris	114. 60.		
Latus majus	622. 00.		
Baſis æquicruri	507. 40.		
Semiſſis	253. 70.	*Log.* 137160.	
Reſiduum ablato baſis ſemiſſe	368. 30.	*Log.*	99886.
Latus minus	507. 00.	*Log.* 67924.	
Latus medium	573. 00.	*Log.*	55687.

Reſidui manent duo Logarithmi 69236. 44199.
Duorum Elementorum anguli 30.G.1'. 40.G.0'.
Ergo totus angulus iſte eſt 70.G.1'.
Duo verò minores ſunt Complementa Elementorum ſcilicet 59.G.59'. & 50.G.0'.

Hæc igitur de Uſu Chiliadis noſtræ hâc vice ſufficiant.

F I N I S.

(*)

Cor-

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